



Analysis

Do People Care About Future Generations? Derived Preferences from Happiness Data

Stefano Bartolini^a, Francesco Sarracino^{b, c, d, *}^a University of Siena, 7, P.zza San Francesco, 53100 Siena, Italy^b Institut National de la Statistique et des Etudes Economiques du Grand-Duché du Luxembourg (STATEC), 13, rue Erasme, L-2013, Luxembourg^c Agence pour la Normalisation et l'Economie de la Connaissance (ANEC), Luxembourg^d LCSR National Research University Higher School of Economics, Russian Federation

ARTICLE INFO

Article history:

Received 28 February 2016

Received in revised form 17 June 2017

Accepted 24 June 2017

Available online 27 July 2017

JEL classification:

D62

D63

I31

Q51

Keywords:

Subjective well-being

Long-term discount rate

Intergenerational equity

Sustainability

Discounting

Climate change

ABSTRACT

The main approaches for computing very long-term discount rates – revealed and stated preferences – have limitations. We overcome previous shortcomings using derived preferences, i.e. we retrieve information on very long-term time preferences from happiness data and people's expectations about the living conditions of future generations. We account for possible endogeneity between expectations about the future and current well-being using 2SLS. We find that negative (positive) expectations about future generations have a very large negative (positive) impact on subjective well-being. This finding suggests that the very long-term discount rate is lower than implied by most traditional economic analyses.

© 2017 Elsevier B.V. All rights reserved.

1. Introduction

How much do people care about future generations? Very long-term time preferences are critical to assess the amount of resources that current generations are willing to allocate for the prevention or mitigation of future environmental problems. The debate raised by the Stern Review (Stern, 2007) represents a paradigmatic example. The authors' call for immediate action to reduce global warming is based on the assumption of a very low discount rate. Stern and collaborators argue that discounting the very long-term future involves an ethical consideration regarding future generations, which is not implied by discounting the future

over one's lifetime. Weitzman (2007) and Nordhaus (2006), among others, criticized Stern's claim based on their extreme assumption about time preference, which amplified the benefits of deep cuts of greenhouse gas emissions. Most criticism focus on high discount rates revealed by asset markets – often close to 6%, the private return to capital.

However, revealed preferences can hardly answer the opening question of this paper. While private markets provide reliable information about societal evaluation of time within a generation, no comparable private rates exist to evaluate events that will occur beyond our lifetimes. The few estimates of private market discount rates for very long horizons (100 or more years), conclude that they are much lower than implied by most economic analyses (Giglio et al., 2014).

Some researchers tried to overcome the limitations of market data by estimating the long-term discount rate through questionnaires. They ask people to state their preferences about the complex trade-off between current and future outcomes (Layton and Brown, 2000; Atkinson et al., 2009). The main limitation of

* Corresponding author at: Institut National de la Statistique et des Etudes Economiques du Grand-Duché du Luxembourg (STATEC), 13, rue Erasme, L-2013, Luxembourg.

E-mail addresses: bartolinist@unisi.it (S. Bartolini), Francesco.Sarracino@statec.etat.lu (F. Sarracino).

the stated preferences approach is that survey answers may be driven by respondents' desire to buy 'moral satisfaction' (Kahneman and Knetsch, 1992). Moreover, respondents may find the complex present/future trade-offs cognitively demanding and therefore they may be reluctant to undertake the effort to provide answers that accurately reflect their preferences.

The approach that we propose overcomes the limitations of both revealed and stated preferences. We derive information on the degree of people's concern for the very long-term future by estimating the relationship between individuals' current well-being and their expectations about a future far enough to concern only future generations. If the long-term discount rate is high, we expect people's view of the future – whatever it may be – to have a weak or null influence on their current well-being. A high discount rate implies that current generations give limited importance to the living conditions of future generations. In this case, we expect that the SWB of current generations is not substantially affected by their view – either positive or negative – about something of little importance to them. In contrast, positive (negative) expectations about the living conditions of future generations have a sizable and positive (negative) impact on current SWB only if people care about future generations, i.e. the discount rate is low. Simply stated, positive expectations of the future are associated with greater current well-being, if and only if individuals have a low long-term discount rate.

To estimate this relationship we use survey data from several international and national databases. We proxy for current well-being with subjective well-being (SWB) and the expectations about the very long-term future with specific questions on the issue. We run SWB regressions using the standard controls and we include the perception of the future as our variable of interest. Our estimates indicate that the size of the coefficient on future perceptions is comparable to the most important correlates of SWB, such as being married or unemployed. We run Two-Stages Least Squares (2SLS) regressions to account for the possible endogeneity of expectations about the future. Our instrumental variables are trust in science and political trust. These variables are available at the same time only in one of our datasets, the American General Social Survey, whereas the World Values Survey and the European Social Survey only include political trust. The correlation of these two forms of trust with SWB is nil in our datasets, and we did not find any evidence of their correlation in the literature. Yet, both trust in science and in political institutions are good predictors of individuals' expectations about the future. Scientific progress can contribute to a better future in many respects, including sustainability. Scientific advancements are critical to sustainability, such as the development of renewable sources of energy. Moreover, a "bright future" requires effective political decisions. That is why, for instance, those who think that political institutions have short-term goals, are self-serving, or serve special interests, are less likely to expect a "bright future". For these reasons we expect our instrumental variables to be relevant, excludable, and their use will address potential bias from omitted variables, measurement error, and reverse causality.

We find that negative (positive) expectations about future generations have a very large negative (positive) impact on SWB. Results are consistent across different datasets, countries, years, and question wording. The necessary amount of income to compensate for the loss of well-being associated with gloomy expectations about the living conditions of future generations is large, both in relative and absolute terms. These results suggest that the intergenerational discount rate is low.

We use very different information than what is used by the revealed and stated preferences approaches. Similar to the latter approach, we rely on survey data. Yet, we do not use people's statements about their preferences for given hypothetical outcomes. We rely on questions that ask people about their current well-being

and their perceptions about the future. In other words, we derive our estimates of people's preferences from the impact of an expected outcome on people's current well-being. For this reason, we refer to this approach as derived preferences. Because the information we use does not concern the willingness of individuals and does not imply their awareness of the link between future scenarios and present well-being, our approach is not biased by the search for moral satisfaction and self-image enhancement that affects stated preferences. Additionally, the questions we use are not cognitively demanding, thus solving the main shortcomings associated with the stated preferences approach.

Our contribution is two-fold: on one hand our results suggest that the very long-term discount rate is low, on the other, they indicate a way to overcome the limitations of revealed and stated preferences in estimating the very long-term discount rate.

The paper is organized as follows: [Section 2](#) summarizes the literature about long-term discount rates. [Section 3](#) presents our data, while [Section 4](#) discusses the methodological issues. [Section 5](#) presents our findings and [Section 6](#) concludes.

2. Background

Typically, the results from cost–benefit analyses of projects aimed at reducing the impact of biodiversity loss, groundwater pollution, fishery depletion, radioactive waste disposal, minerals depletion etc., crucially depend on the very long run discounting. These analyses are so sensitive to even tiny changes in the discount rate that almost any policy prescription can be supported by one choice of a discount rate or another.

The Stern Review led to a large discussion relating to the discount rate. [Gollier and Weitzman \(2010\)](#) defended Stern's decreasing term structure of discount rates, arguing that, since risks are magnified by time, future risk should induce prudent consumers to sacrifice more for the future. This means using a decreasing discount rate for greater periods of time. [Dietz and Asheim \(2012\)](#) criticized the ethical foundation of the Stern Review for being committed to undiscounted utilitarianism, which assigns zero relative weight to present utility. They propose to adopt a different ethical principle, sustainable discounted utilitarianism, which assigns zero weight to present utility if and only if present utility exceeds future welfare. [Beckerman and Hepburn \(2007\)](#) argued that the Stern Review considers a narrow range of plausible ethical approaches and adopts an 'impersonal consequentialist view', suggesting that the welfare of future generations ought to be valued equally with the welfare of people alive today. As an alternative, Beckerman and Hepburn propose to adopt 'agent-relative' ethics, which has a distinguished pedigree going back to David Hume and suggests positive discount rates. [Weitzman \(2007\)](#), [Nordhaus \(2007\)](#), and [Anthoff et al. \(2009\)](#) criticized the Stern Review on the empirical basis that "extreme values of the social cost of carbon are associated with positions that are at odds with revealed preferences on time preference" ([Anthoff et al., 2009](#), p. 17). People are not observed to behave as if they have a zero discount rate.

The latter criticisms probably overstated the amount of empirical information available on how people discount the distant future. Revealed preferences are of little help because long-maturity assets providing information on individuals' valuation of very long run claims are rare. [Giglio et al. \(2014\)](#) estimate the very long run rate of time preference by exploiting a unique feature of residential housing markets in England, Wales, and Singapore, where residential property ownership takes the form of either leaseholds (temporary, tradable ownership contracts with maturities between 50 and 999 years) or freeholds (perpetual ownership contracts). They find a downward sloping term structure of discount rates, consistently with models including hyperbolic discounting

(Laibson, 1997; Luttmer and Mariotti, 2003) and gamma discounting (Weitzman, 1998, 2001).

An alternative way to estimate the long-term discount rate is based on stated preferences. Survey questions ask respondents to choose between alternatives suggesting that current sacrifices produce better outcomes in the distant future. Answers are used to calculate to what extent individuals discount future benefits. Layton and Brown (2000) asked 376 subjects to state their preferences for mitigating impacts of climate change that will occur in the distant future. Consistent with Giglio et al. (2014), they find a decreasing term structure of discount rates. Atkinson et al. (2009) surveyed over 3000 people to investigate their time preferences. Drawing on Barsky et al. (1997) and Carlsson et al. (2005), the authors disentangle three components of time preference: attitudes to risk, income inequality over space, and income inequality over time. They find that these preferences are only weakly correlated, suggesting that individuals do not see the three concepts as identical.

The main drawback of these studies is that respondents' stated preferences may be driven by the "purchase of moral satisfaction" and differ from their 'true' preferences (Kahneman and Knetsch, 1992). For example, if the act of choosing a more sustainable society gave the respondents moral satisfaction, then the estimates of the discount rate would be downwardly biased. Given the great importance of self-image or perceptions of identity (Akerlof and Kranton, 2000), this effect can be substantial in the context of choices having great ethical importance, such as those about the living conditions of future generations. In such a context, the stated preferences may reflect wishful thinking. The preferences stated in a hypothetical situation may be different from those revealed when individuals experience the budget constraints of real life. Willingness to protect future generations could be reduced when facing the daily experience of current sacrifices required by such protection. Moreover, respondents may find the complex trade-offs between current and future outcomes administered in the questionnaires cognitively demanding. This may prevent them from undertaking the effort to provide accurate answers about their preferences (Freeman, 1979).

Summing up, the empirical information about the very long-term discount rate is limited and controversial. This created a confusing situation in which countries adopted different decisions. Several countries – such as France, the UK, Denmark or Norway – adopted low discount rates to evaluate projects that imply important intergenerational benefits or costs. Other countries instead, adopted higher discount rates, closer to the values suggested by financial markets. Such decisions are largely based on interactions between government officials and experts (Cropper et al., 2014; Sunstein, 2014). However, given the scarcity of empirical information, experts are likely to only replicate the different opinions about time preference. Those involved in environmental agencies, highly attentive to the interests of future generations, likely favor low discount rates, while economic advisors probably favor higher rates (Sunstein, 2014).

3. Data

To perform our test we use individual level information about subjective well-being – our outcome variable – and people's perceptions about future, along with a standard set of socio-demographic control variables.

This information is available in various national and international datasets. Among these, the World Values Survey (WVS)¹ covers

many developed, developing and transition countries. The WVS was established in 1981 and is currently conducted in more than 80 countries world-wide, with nationally representative samples. In each wave and country, between 800 and 4000 people are surveyed with a total of about 250,000 observations. The WVS was administered in 1981–1984, 1989–1993, 1994–1999, 1999–2004 and 2005–2009 at the time of writing. We run our baseline analysis using the WVS because of its large country coverage and of the availability of a reliable instrumental variable to account for potential endogeneity. The American General Social Survey (GSS) and the European Social Survey (ESS) also provide valuable information about people's well-being and expectations about the future, along with suitable instruments, but have smaller country coverage. We report the results using these surveys in Section 5.3.2. Finally, we use data from the American's Changing Lives of 2002 (ACL), the Eurobarometer of 2009, the German General Social Survey (GGSS) of 2008, and the European Quality of Life of 2007 (EQLS) to check the robustness of our findings (see Section 5.3).

3.1. Subjective Well-being

Individual well-being is proxied by SWB, a concept developed in social psychology in the early 1950s, and increasingly adopted in social sciences, including economics (Dolan et al., 2008; Powdthavee, 2010a). SWB is the reported evaluation of one's own well-being and it is commonly observed through answers to questions about people's happiness or life satisfaction (Van Praag et al., 2003).

The wording of the happiness question in the WVS is: "Taking all things together, would you say you are: 1 Very happy, 2 Quite happy, 3 Not very happy or 4 Not at all happy.", whereas the wording of the question about life satisfaction is: "All things considered, how satisfied are you with your life as a whole these days? Please use this card to help with your answer.", the card displays a scale from 1 to 10, where 1 is "dissatisfied" and 10 is "satisfied".

For present purposes, we use life satisfaction as a proxy for SWB. However, our conclusions are confirmed when happiness is instead used as a proxy for SWB. When using the happiness question we reversed the scale so that higher values are associated with stronger feelings of well-being.

The reliability of subjective well-being has been investigated by an interdisciplinary literature. SWB is well correlated with objective measures of well-being such as the heart rate, blood pressure, frequency of Duchenne smiles and neurological tests of brain activity (Blanchflower and Oswald, 2004; van Reekum et al., 2007). Moreover, subjective measures of well-being are strongly correlated with other proxies of SWB (Schimmack et al., 2010; Schwarz and Strack, 1999; Wanous and Hudy, 2001) and with the evaluations about the respondent's happiness provided by friends, relatives or clinical experts (Schneider and Schimmack, 2009; Kahneman and Krueger, 2006; Layard, 2005).

3.2. Perception About the Future

We are interested in a question that asks people about their perceptions of the very long-term future, i.e. a future remote enough not to directly affect the respondent. This question must concern future conditions generally, i.e. very large numbers of people and not only special groups.

The wording of the expectations about the future question that is available in the WVS is: "For each of the following pairs of statements, please tell me which one comes closest to your own views: (A) Humanity has a bright future; (B) Humanity has a bleak future." This variable has been recoded to 1 if the respondent expects that Humanity has a bleak future and 0 otherwise.

We include this variable in a standard happiness regression to check whether future expectations are related to current well-being.

¹ World Values Survey 1981–2008 official aggregate v.20090901, 2009. World Values Survey Association (www.worldvaluessurvey.org). Aggregate File Producer: ASEP/JDS, Madrid.

Table 1
Cross-tabulation of life satisfaction and the expectations about the future (WVS data).

Life satisfaction	0 Bright future	1 Bleak future	Total
1 Dissatisfied	43	93	136
2	24	84	108
3	112	207	319
4	137	247	384
5	409	810	1219
6	519	639	1158
7	990	1074	2064
8	1641	1343	2984
9	1058	811	1869
10 Satisfied	978	657	1635
Total	5911	5965	11,876

A high discount rate implies a weak or non-significant relationship between SWB and the perception of the future. Instead, a low discount rate implies that people's expectations about the future should significantly impact their current well-being.

Table 1 reveals that across countries there are more people who are dissatisfied with their life and think that humanity has a bleak future than dissatisfied people with positive expectations for future. This suggests a positive correlation between life satisfaction and future expectations. A similar pattern can be observed when using happiness instead of life satisfaction (see Table A.7 in the Appendix). There is an approximately equal number of people that fall into the two expectations groups.

3.3. Control Variables

We include a standard set of socio-demographic and economic control variables. In particular, we include a variable on gender, taking the value 1 if the respondent is female, 0 otherwise. We control for age and age squared to account for the non-linear relationship between aging and well-being². We include a set of dummies to control for the marital status of the respondent as well. The dummies are: “married”, “living together as married”, “divorced”, “separated” and “widowed”, whereas “single” is used as the reference category.

Regressors also include the number of respondent's children. This variable has been recoded into three dummies: one child, two children and three or more children. Having no children is used as the reference category. Likewise, we control whether the respondent is living with his/her parents with a binary variable. To control for the employment status of the respondent, we included another set of dummy variables, namely: “retired”, “housewife”, “students” and “unemployed”, leaving “employed” to be the reference category. We control for the education of the respondent by including a categorical variable taking values from 1 to 8, where 1 and 8 represent an “inadequately completed elementary education” and a “University with degree/Higher education – upper-level tertiary certificate”, respectively. Having no education is the reference category.

Household income is observed using people's self-reports. Each respondent is asked to declare which income interval he/she belongs to. The variable is organized in 10 intervals, where 1 and 10 stand for the lowest and the highest income group, respectively. Finally, we control for the years and the countries where the interviews were taken. The Appendix provides a table of descriptive statistics for each control variable.

² We divided age squared by 100 to indicate the minimum of the parabolic age curve.

Table 2
Availability of data over time (WVS data).

	Developed countries						
	1994	1995	1996	1997	1998	2004	Total
Australia	0	2048	0	0	0	0	2048
Taiwan	780	0	0	0	0	0	780
Finland	0	0	987	0	0	0	987
Germany	0	0	0	2026	0	0	2026
Japan	0	1054	0	0	0	0	1054
South Korea	0	0	1249	0	0	0	1249
New Zealand	0	0	0	0	1201	954	2155
Norway	0	0	1127	0	0	0	1127
Spain	0	1211	0	0	0	0	1211
Sweden	0	0	1009	0	0	0	1009
Switzerland	0	0	1212	0	0	0	1212
Great Britain	0	0	0	0	1093	0	1093
United States	0	1542	0	0	0	0	1542
Total	780	5855	5584	2026	2294	954	17,493

3.4. Sample Selection

We begin our analysis with the sample of developed countries available in the WVS, from which we derive our main results. The reason for this choice is that developed countries bear the primary responsibility for the environmental degradation, which is largely due to two centuries of industrial activity. The time preference of people living in industrial countries is crucial because substantial ecological improvements can be obtained only through a strong commitment of such countries to downsize their disproportionate contribution to ecological threats.

Table 2 provides the list of countries and years in which the question on humanity's future was asked. Overall, our sample includes 17,493 observations collected over a period of six years between 1994 and 1998. Only New Zealand has been surveyed twice for our question of interest in 1998 and 2004.

Section 5.3 is devoted to some robustness checks in which we first show that our conclusions also hold for developing and transition countries separately, and for all countries together. Table D.13 in the Appendix provides an overview of the full sample of 54 countries in the WVS for which data on well-being and future expectations are available. Second, we check the robustness of our results using all the datasets where questions on well-being are available along with information on people's perceptions about the future. Furthermore, the GSS and the ESS also provide good instruments to test the robustness of our check for endogeneity. Thus we test our relationship in a variety of contexts and wordings.

3.5. Instrumenting Expectations About the Future

In our model, we assume that expectations about the future are an explanatory factor of SWB. However, it is also plausible that individuals' well-being affects the way they perceive the future. For example, happier people may tend to have more optimistic views about the future and vice versa. Conversely, more depressed individuals tend to self-identify as losers: they may expect for themselves a bleak future, while exaggerating the brightness of others' future. In sum, SWB and future expectations may be endogenous.

To deal with this possibility we instrument the expectations about the future with measures of confidence in science and in political institutions. Both variables are available in the American GSS, while confidence in political institutions is available in the WVS and the ESS.

The wording of the question about confidence in scientific community in the GSS is: “As far as the people in scientific community are concerned, would you say you have a great deal of confidence, only some confidence, or hardly any confidence at all in them?”. Answers

Table 3

Expectations about the future and life satisfaction in developed countries.

Life satisfaction		
Bleak future	−0.515***	(−8.42)
Woman	0.166**	(3.64)
Married	0.664***	(5.88)
Living together	0.594**	(4.02)
Divorced	0.0300	(0.24)
Separated	−0.643***	(−5.57)
Widowed	0.00102	(0.01)
Retired	−0.0696	(−0.91)
Housewife	0.0188	(0.28)
Student	0.102	(1.02)
Unemployed	−0.741**	(−3.75)
One child	−0.0677	(−1.20)
Two children	−0.111	(−1.51)
Three or more children	−0.0606	(−0.86)
Living with parents	−0.0784	(−0.97)
Age	−0.0680***	(−10.11)
Age ² /100	0.0756***	(11.59)
Education level	0.0296	(2.00)
Scale of income	0.0724**	(4.28)
Constant	7.068***	(30.59)
Observations	8989	
Adjusted R ²	0.134	

t Statistics are in parentheses.

Regressors include both year and country dummies, but coefficients are omitted for brevity.

* $p < 0.05$ ** $p < 0.01$.*** $p < 0.001$.

are coded on a 3-point scale where 1 means “a great deal” and 3 stands for “hardly any”.

Arguably, a bright future requires a substantial scientific contribution in many respects, including sustainability. Critical issues for sustainability, including the development of renewable supply of energy, crucially hinge on scientific progress. Some technical change has already contributed to sustainability. Consider, for example, the drop in the cost for generating photovoltaic energy on a per kilowatt/hour basis, or the decrease in paper consumption due to the substitution of printed paper with electronic screens. Consequently, it is reasonable to expect that those who distrust science are more likely to expect a bleak future. Conversely, [Bartolini et al. \(2013\)](#) show that confidence in the scientific community is not correlated to happiness in the American GSS, and in our sample the correlation coefficient between the two variables is 0.07, i.e. nearly zero. For these reasons we consider our proxy of trust in science as a valid instrumental variable for the expectations about the future. As mentioned before, the GSS also provides information about people's confidence in political institutions. In particular, during the interviews people were asked the following question: “As far as the people running the Congress are concerned, would you say you have a great deal of confidence, only some confidence, or hardly any confidence at all in them?”. The answers are coded from 1 (‘A great deal’) to 3 (‘Hardly any’) and in our sample the correlation coefficient of confidence in the Congress with happiness is 0.08.

Confidence in political institutions is a relevant instrumental variable because it is hard to imagine that a bright future can be built in the absence of effective collective choices aimed at improving future conditions of life. Low confidence in political institutions – the main form of collective action – implies low confidence that it is possible to coordinate actions towards a desirable shared future. The effectiveness of political institutions is critical to prevent and cope with future crises, including ecological ones. That is why a ‘bright future’ is not predicted by those who think that political institutions have – for instance – short-term goals or serve special interests. Hence, people who do not trust political institutions are more likely to foresee a bleak future. As shown in [Table 4](#), political distrust is a good predictor of long-term future expectations.

Table 4

Instrumenting the expectations about the future with political distrust. The analysis uses WVS data.

Dependent variable	Reduced form	OLS	2SLS
	Bleak future	Life satisfaction	Life satisfaction
Bleak future		−0.515 *** (−8.42)	−1.285*** (−4.73)
Political distrust	0.176*** (12.93)		
Woman	0.0279 (1.01)	0.166** (3.64)	0.191*** (3.52)
Married	−0.0208 (−1.41)	0.664*** (5.88)	0.643*** (6.03)
Living together	0.00867 (0.44)	0.594** (4.02)	0.602*** (4.29)
Divorced	0.0407 (1.57)	0.0300 (0.24)	0.0618 (0.54)
Separated	−0.0784 (−1.53)	−0.643*** (−5.57)	−0.697*** (−5.91)
Widowed	−0.000778 (−0.03)	0.00102 (0.01)	−0.00715 (−0.06)
Retired	0.0514 (2.18)	−0.0696 (−0.91)	−0.0320 (−0.41)
Housewife	−0.0190 (−1.05)	0.0188 (0.28)	0.00103 (0.02)
Student	−0.0349 (−1.51)	0.102 (1.02)	0.0691 (0.76)
Unemployed	0.0503* (2.89)	−0.741** (−3.75)	−0.698*** (−3.90)
One child	0.0169 (0.67)	−0.0677 (−1.20)	−0.0501 (−0.90)
Two children	0.0106 (1.11)	−0.111 (−1.51)	−0.0993 (−1.43)
Three or more children	−0.00781 (−0.39)	−0.0606 (−0.86)	−0.0657 (−0.92)
Living with parents	0.0275 (1.08)	−0.0784 (−0.97)	−0.0588 (−0.74)
Age	−0.00144 (−0.51)	−0.0680*** (−10.11)	−0.0690*** (−11.78)
Age ² /100	0.000905 (0.32)	0.0756*** (11.59)	0.0762*** (11.44)
Education level	−0.0175*** (−4.14)	0.0296 (2.00)	0.0154 (1.31)
Scale of income	−0.00783* (−2.67)	0.0724** (4.28)	0.0655*** (3.85)
Constant	0.491*** (7.33)	7.068*** (30.59)	7.354*** (38.23)
Observations	9008	8989	8989
Adjusted R ²	0.134	0.134	—
F-statistic			166.22

t Statistics are in parentheses.

Regressors include both year and country dummies, but coefficients are omitted for brevity.

* $p < 0.05$.** $p < 0.01$.*** $p < 0.001$.

Conversely, in the literature on SWB we did not find any evidence that political distrust affects well-being. Several political factors are related to well-being, including the degree of direct democracy and the quality of government ([Bjørnskov et al., 2010](#); [Ott, 2010](#)). [Frey and Stutzer \(2000\)](#), exploiting variation in institutional settings across Swiss regions, found that people who can exercise direct democracy through tools such as popular initiatives and referenda are happier than those that cannot. [Helliwell and Huang \(2008\)](#) and [Helliwell et al. \(2014\)](#) found in a large sample of countries that life satisfaction is more closely related to the quality of governments (as measured by World Bank indicators) than to GDP. However, trust in political institutions is not usually included among the happiness regressors and the scarcity of papers on this subject probably reflects the lack of relations between SWB and political trust. [Bartolini et al. \(2013\)](#) show that confidence in the Congress is not correlated to happiness in the American GSS, after controlling for confidence in

other institutions. This is confirmed by our evidence showing that the correlation between political distrust and well-being in the WVS is basically nil.

In sum, there is no evidence suggesting that political distrust might affect well-being in other ways than through the possibility of pursuing socially coordinated actions aimed at improving the future. This indicates that political distrust satisfies the validity condition, which requires the instrumental variable to be orthogonal to the error term. These relationships are statistically tested in the first step of regression 4 presented below and the results are discussed in Section 5 (see Table 4 in Section 5.2).

Using the GSS data, we run one 2SLS with confidence in science as an instrument, and one 2SLS with two instruments: confidence in science and in the Congress.

In the WVS, people were asked about their confidence in the Parliament and in the Government. In both cases the wording is as follows:

“I am going to name a number of organisations. For each one, could you tell me how much confidence you have in them: is it (1) a great deal of confidence, (2) quite a lot of confidence, (3) not very much confidence or (4) none at all?”.

Based on these two items, we create a dummy variable that takes the value 1 if the respondent answered “not very much” or “not at all” to at least one of the two questions, 0 in all other cases. The correlation coefficient of our dummy with life satisfaction is 0.01, while it is 0.03 for happiness.

The ESS also includes a useful instrumental variable, related to trust in the Parliament. This variable is coded on an 11-point scale where 0 means the respondent does not trust the parliament at all, and 10 means that the respondent has complete trust in the Parliament. The correlation coefficient of this variable with life satisfaction is 0.33, and 0.06 for happiness.³ The correlation coefficient between trust in Parliament and life satisfaction becomes insignificant after including the socio-demographic control variables. Results are reported in Appendix F.

In sum, empirically our instrumental variables are not correlated with the dependent variables which suggests that the exclusion restriction is satisfied. The lack of correlation between trust in political and scientific institutions and SWB may appear surprising in the light of the well-known positive correlation between trust in others and well-being. The difference is due to the fact that trust in others is a relational variable, i.e. a measure of the quality of human relationships. All the relational variables, also called “relational goods” (Uhlener, 1989, Gui and Sugden, 2005), such as one's quantity and quality of relationships with friends, relatives and neighbors, or associational activity, or other forms of relational trust (e.g. in others' solidarity or honesty), are well correlated to SWB (Helliwell, 2001; Helliwell and Putnam, 2004; Bruni and Stanca, 2008; Becchetti et al., 2008; Becchetti et al., 2009). Conversely, trust in institutions exhibits different characteristics because it does not concern relationships among people, but between people and institutions. That is why confidence in political and scientific institutions, are not correlated with subjective well-being, in contrast to relational goods (Bartolini et al., 2013).

4. Methodological Issues

To test our hypothesis we use OLS and 2SLS regressions. We are aware that, given the ordinal nature of our dependent variable, ordered probit or logit models should be preferred. However, the

recent literature demonstrated that, when the dependent variable has a sufficient number of categories, OLS provides equivalent results and have the advantage of making comparisons across different models easier (Ferrer-i Carbonell and Frijters, 2004). In particular, Ferrer-i Carbonell and Frijters (2004) conclude that assumptions about the ordinality or cardinality of answers to SWB questions are “relatively unimportant to results”⁴.

However, to check the consistency of our results, we replicate our estimates using ordered probit and logit models as well. Results do not change, as reported in the Appendix on page 45.

The baseline regression model is:

$$SWB_i = \alpha + \beta_1 \cdot \text{bleakfuture}_i + \theta \cdot \mathbf{X}_i + \epsilon_i \quad (1)$$

where SWB is proxied by life satisfaction and happiness, respectively; bleakfuture_i are respondents' expectations about the future and thus β_1 represents the coefficient of interest; $\mathbf{X}_i$ is a vector of independent variables including socio-demographic control variables, country and time dummies; θ is the associated vector of coefficients; ϵ_i is the error term and the index i is for individuals.

In a second step, we instrument the variable of interest in order to check for causality.

4.1. Testing for Causality

The coefficients from Eq. (1) provide information about the sign and magnitude of partial correlations among variables, but they do not allow for any causal interpretation.

To address this issue, we run a further set of regressions with instrumental variables using the two stage least squares (2SLS) model (Wooldridge, 2002).

In case of the GSS, where two instrumental variables are available, the 2SLS model is as follows:

$$\text{bleakfuture}_i = \gamma_1 + \gamma_2 \cdot \text{confidence_congress} + \gamma_3 \cdot \text{confidence_science} + \gamma_4 \cdot \mathbf{X}_i + \mu_i \quad (2)$$

$$SWB_i = \alpha + \Phi \cdot \mathbf{X}_i + \vartheta \cdot \widehat{\text{bleak_future}}_i + \epsilon_i \quad (3)$$

where SWB is proxied by happiness; Φ is a vector of coefficients of the control variables $\mathbf{X}_i$, including year dummies; ϑ is the coefficient of the expectations about the future; bleakfuture_i is the variable of interest and it is based on people's agreement with the sentence: “It's hardly fair to bring children into the world with the way things look for the future”; $\widehat{\text{bleak_future}}_i$ is the corresponding variable predicted after the first stage regression. Answers are coded as a binary variable; $\text{confidence_congress}_i$ and $\text{confidence_science}_i$ are the instrumental variables; and ϵ_i is the error term.

In the WVS and the ESS analyses, our instrumental variable is political distrust, which is used to predict future expectations in the first stage. The predicted values are subsequently used in the second stage regression to explain SWB. In this case the 2SLS model can be written as:

$$\text{bleakfuture}_i = \pi_1 + \pi_2 \cdot \text{political_distrust} + \pi_3 \cdot \mathbf{X}_i + \nu_i \quad (4)$$

$$SWB_i = \alpha + \theta \cdot \mathbf{X}_i + \gamma \cdot \widehat{\text{bleak_future}}_i + \epsilon_i \quad (5)$$

where SWB is proxied by life satisfaction and happiness; θ is a vector of coefficients for the control variables $\mathbf{X}_i$ including year dummies; γ is the coefficient for expectations about the

³ The wording of the question is: “Using this card, please tell me on a score of 0–10 how much you personally trust each of the institutions I read out. 0 means you do not trust an institution at all, and 10 means you have complete trust.”

⁴ Ferrer-i Carbonell and Frijters (2004).

future; $bleak_{future_i}$ is the variable of interest; ϵ_i is the error term; $E[\epsilon_i \cdot political_distrust_i | x_i, bleak_future_i] = 0$ with $political_distrust_i$ being the instrumental variable as defined in Section 3.5. When using World Values Survey data, in which observations are collected in various countries over time, we use clustered standard errors by country and year. When using the European Social Survey data, in which observations are collected across countries, we use clustered standard errors by country. In all the cases when the data are issued only within a country survey, we use robust standard errors.

5. Results

Table 3 shows the estimation results from the WVS for developed countries. The relationship between expecting a bleak future and life satisfaction is negative and highly significant. Having the perception that the future will be bleak rather than bright is associated with about 5.2% lower life satisfaction. This is a remarkably large magnitude, comparable with some well-established correlates of well-being, such as being married or unemployed. The result also holds when we use happiness as the dependent variable instead of life satisfaction. The happiness of those who see a bleak future is 4.25% lower than those who see a bright future (see Table C.11 in the Appendix).

The sign and magnitude of the coefficient of future expectations suggest that this variable is an important component of people's well-being. In other words, people are less satisfied with their lives if they expect future generations to have a bleak life. This result is robust to the inclusion of all the standard control variables of a happiness regression.

The coefficients of the other control variables have the expected signs and are consistent with previous findings from the literature.

5.1. Time Preference Across Sub-groups of the Population

One might suspect that various sub-groups of a population have different attitudes towards the future. For example, it is plausible that women or more educated people are relatively more concerned about the long-term future. The same might apply to people with children compared to people without; or younger individuals compared to elderly ones, because the former have (or will have) younger descendants that are more likely to be affected by future crises. In this light, demographic changes, such as a decline in the birth rate or the aging of the population, may drive an increase in the discount rate. To test these hypotheses we run a set of regressions where the model associated with Eq. (1) is extended to include interaction terms between the expectations about the future and age, having children, gender, marital status, and education level (see Tables E.16 and E.17 in Appendix E).

We do not find any significant difference in the time preference among sub-groups. This result is consistent with Stern's (2007) claim that discounting the very long-term future involves an ethical care about future generations, which is not implied by discounting the future over one's lifetime. In particular, the unchanging concern for future generations among different age cohorts and sub-groups with/without offspring, suggests that the very long-term time preference is not shaped by inter-temporal self-interest. At the same time, this evidence indicates that our results are not driven by an omitted variable that systematically varies by population group.

5.2. Test of Causality

The first column of Table 4 shows the coefficients for the first stage where the variable bleak future is regressed on political distrust and a set of control variables using clustered standard errors and WVS data; the second column of Table 4 presents the coefficients from the standard OLS model to ease comparison; the last column

reports the coefficients from the second stage of the 2SLS regression where life satisfaction is regressed on the predicted values of bleak future, along with the set of control variables and using clustered standard errors.

The results of the estimated reduced form model support the relevance condition necessary for 2SLS analysis (see Section 4.1): political distrust is positively and significantly correlated to expectations about the future. The relevance of political distrust is further confirmed in the first stage regression by the high value of the F-statistic⁵. The correlation between our instrumental variable and SWB is nearly zero, suggesting the validity condition, which requires the excluded instrument to be orthogonal to the error term, is met.

Results from the 2SLS show that the coefficient of expectations about the future becomes about two times larger than in the OLS case and it remains statistically significant. Similarly, several significant coefficients of the control variables in the OLS estimation become more significant in the 2SLS regression. The estimates suggest that a respondent who expects humanity to have a bleak future is 12.85% less satisfied with his or her life than a respondent having positive expectations. The happiness regression shows similar results: having bad expectations about the future reduces current well-being by about 7% (see Table C.12 in the Appendix).

Individuals that are optimistic about the future report substantially higher SWB than those with bleak views. According to the estimates from the WVS, the amount of income necessary to compensate for bleak views, i.e. to feel equally as well off as those with bright views, is U.S.\$ 87,500 (for an American earning U.S.\$ 16,250 in 1995). Moving from U.S.\$ 16,250 to U.S.\$ 87,500 was the same as moving from the first to the seventh income decile. Using the 2SLS estimates, the income equivalent is even larger and would amount to moving from the first to the tenth decile. This amount is referred to as the income equivalent of having a bright future, which is rather large in the present case.

This is a large shift which is, at least in part, explained by the endogeneity of income, which we cannot address with our data. Previous studies documented that failing to account for income endogeneity in a happiness regression can result in coefficients being underestimated by two (Powdthavee, 2010b) or three times (Knight et al., 2009; Luttmer, 2005). This implies that we probably overestimated the income compensation for the loss of well-being due to future negative expectations by two or three times. However, even accounting for such bias, the income equivalent remains substantial, thus further suggesting that the discount rate is low.

5.3. Robustness Checks

5.3.1. Estimates Using Different Sets of Countries

How much does the selection of the countries affect the results? To what extent do our results hold outside the industrialized world? The WVS allows us to address these questions using information on a large number of countries, including many developing and transition ones⁶.

Results are presented in Table 5. To ease comparison, the first two columns report the results of the OLS and the 2SLS regressions for the sample of developed countries. Columns 3 and 4 provide the same information for transition economies, columns 5 and 6 refer to developing countries, whereas the last two columns provide the results of regressions including all the countries available in the WVS⁷.

⁵ The rule of thumb suggests that values larger than ten indicate a strong instrument (Gujarati, 2011).

⁶ For a complete list of countries, their sample sizes and the years of observation, please refer to Table D.13 in the Appendix.

⁷ Results using happiness as dependent variable are available in Appendix D.

The relationships between expectations about the future and life satisfaction are consistent across samples. The *F*-statistics from the first-stage regressions are large enough to confirm the relevance of the instrumental variable and its strength. The signs of the instrumented variables are negative, large and significant. Moreover, the coefficients for transition and developing countries are larger than the ones for developed countries. In the 2SLS regressions, a bleak perception of the future lowers people's life satisfaction by 31.65% in transition countries and 27.73% in developing ones (12.85% in developed ones). This evidence is inconsistent with the idea that people's concerns for environmental quality tend to increase with income.

In each case, the magnitudes are large. Although the coefficients for transition and developing countries are more than two times larger than the ones for industrial countries, people living in the latter seem to be greatly concerned for future generations. In the overall sample, having bad expectations about the future lowers life satisfaction by 23.8%.

Moreover, the signs and the significance of the control variables are quite consistent across samples and in line with previous results from the literature.

Our results are also confirmed when life satisfaction is substituted with happiness as the dependent variable (see Table D.15 in the Appendix).

5.3.2. Estimates Using Different Datasets

In addition to the WVS, we found six other datasets that provide information on people's expectations about the long-term future and subjective well-being along with a set of control variables. To check the robustness of our results, we replicate our regressions on these datasets.

The complete list of datasets, the exact wording of the proxies for well-being and for expectations about the future and the transformations applied to these variables are presented in Table 6. As illustrated in columns 2 and 3, these datasets provide a rich set of alternative wordings to test the robustness of our main findings.

Results are presented in Tables F.18 to F.26 in Appendix F. For each dataset we run three different models: in the first a proxy of well-being is regressed only on the expectations about the future; in the second model controls are included for year or, in case of cross-national surveys, for country; in the third the same set of control variables is included from Eq. (1). We used ordered probit models with robust standard errors and reported marginal effects. In the case of the European Quality of Life Survey, we run an OLS with robust standard errors because the dependent variable ranges from 1 to 10. Additionally, in the cases of the ESS and the GSS, we also report a table with 2SLS estimates, along with the reduced model and happiness regressions.

Results are consistent with the same pattern that was identified in the WVS. Data from the American GSS, collected between 1973 and 1994, confirm that agreeing that it is hardly fair to bring children into the world with the way things look for the future, is associated with 9.34% lower happiness. Table F.19 shows the results accounting for potential endogeneity between people's well-being and their feelings about bringing children into the world. We estimate two sets of 2SLS: in the first one (columns 3 and 4) we use only confidence in the scientific community as an instrument; in the second set of 2SLS regressions we use confidence in the scientific community and confidence in Congress as instruments (columns 5 and 6). In both cases the results are consistent: the first stages, reported in columns 3 and 5, show that the instrumental variables are significantly associated with perceptions about the future. When using two instrumental variables, the test of over-identifying restrictions (*J*-statistic) supports the validity of our instrumental variables. The predicted values are then used in the second stages (columns 4 and 6) where the magnitudes become respectively 3 and 4 times larger than

the OLS coefficient magnitude. After accounting for endogeneity, the expectations about the future determine a substantial portion of people's well-being. The *F*-statistic from the first stage is large enough to confirm the relevance of the instrumental variables. According to these estimates the income equivalent of positive expectations about the future is 96,356 U.S.\$ for an American earning 15,000 U.S.\$ per year in 1995, which is very similar to the estimates from the WVS.

In 2012, the ESS included a question about people's perceptions of the future for the first time. Interviewers asked respondents to answer a question about how much they agreed with the statement that, given the way things are, it is hard to be hopeful about the future of the world⁸. The answers range on a scale from 1 to 5, where larger values indicate more disagreement. After recoding the answers, so that higher values stand for stronger agreement, we find that perceptions about the future correlate negatively and significantly with people's happiness and life satisfaction (see column 2 of Tables F.25 and F.26, respectively). Since both life satisfaction and happiness are measured on a 10-point scale, it is not surprising that the coefficient magnitudes for perceptions about the future are similar in the two equations: -0.326 for life satisfaction and -0.272 for happiness. The ESS also allows us to account for endogeneity using confidence in parliament as an instrument for the perceptions about the future (see column 1 of tables F.25 and F.26). The second stage confirms that having negative expectations about the future negatively and significantly affects people's well-being. The coefficients become nearly 4 and 6 times bigger than in the case of the OLS estimates for happiness and life satisfaction, respectively (see column 3 of Tables F.25 and F.26). In both cases, the *F*-statistic is large enough to confirm the relevance of the instrument.

The fourth wave of the American's Changing Lives survey, administered in 2002, reveals that those who strongly believe that the future is hopeless and that things are not changing for the better, report on average a 10.6% lower life satisfaction than those who strongly disagree. Remarkably, this coefficient is very similar to the one for people who somewhat believe that the future is hopeless, while those who somewhat disagree report a milder decrease in well-being of about 6%.

In 2009, the respondents from 33 European countries were asked in the Eurobarometer survey whether they expected the younger generations to have an easier or more difficult life than current generations. In this case the figures from Eurobarometer show that those with negative expectations report on average a 7.33% lower life satisfaction, which is two times larger than the difference for people with neutral expectations.

The German General Social Survey in 2008 asked its respondents whether they agreed or disagreed with the statement that, given the future, one can hardly take the responsibility for bringing children into the world. Estimates show that those respondents that are more worried for the future report a 9.25% lower life satisfaction than respondents that are not worried.

The European Quality of Life Survey of 2007 asked about people's optimism for the future in 31 European countries⁹. Life satisfaction and happiness are available, both ranging on a 1 to 10 points scale. Estimates are in line with previous results and consistent between life satisfaction and happiness. Strongly disagreeing with an optimistic view about the future is associated with a 27% lower life

⁸ The list of countries includes: Belgium, Bulgaria, Switzerland, Cyprus, Czech Republic, Germany, Denmark, Estonia, Spain, Finland, Great Britain, Ireland, Israel, Iceland, Netherlands, Norway, Poland, Portugal, Russia, Sweden, Slovenia, Slovakia and Croatia.

⁹ The list of countries includes: Belgium, Denmark, Germany, Greece, Spain, Finland, France, Ireland, Italy, Luxembourg, Netherlands, Austria, Portugal, Sweden, Great Britain, Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovak Republic, Slovenia, Turkey, Norway, Croatia and Macedonia.

Table 5

Effect of the expectations about the future on life satisfaction considering various groups of countries in the WVS.

	Developed countries		Transition countries		Developing countries		All countries	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
Bleak future	−0.515*** (−8.42)	−1.285*** (−4.73)	−0.908*** (−14.61)	−3.165*** (−8.65)	−0.367** (−3.46)	−2.773** (−2.83)	−0.582*** (−8.42)	−2.380*** (−5.16)
Woman	0.166** (3.64)	0.191*** (3.52)	−0.00789 (−0.14)	−0.00246 (−0.04)	0.0344 (0.64)	0.0373 (0.79)	0.0464 (1.34)	0.0643 (1.68)
Married	0.664*** (5.88)	0.643*** (6.03)	0.185 (1.74)	0.174 (1.29)	0.483*** (5.06)	0.503*** (4.57)	0.465*** (6.44)	0.459*** (5.77)
Living together	0.594** (4.02)	0.602*** (4.29)	−0.0259 (−0.20)	0.00296 (0.02)	0.133 (1.11)	0.144 (1.20)	0.218* (2.50)	0.219** (2.59)
Divorced	0.0300 (0.24)	0.0618 (0.54)	−0.269 (−2.05)	−0.227 (−1.43)	−0.114 (−0.65)	0.0258 (0.17)	−0.0580 (−0.63)	0.0243 (0.26)
Separated	−0.643*** (−5.57)	−0.697*** (−5.91)	−0.576* (−2.92)	−0.497* (−2.54)	−0.156 (−1.06)	−0.0711 (−0.44)	−0.299* (−2.59)	−0.278* (−2.07)
Widowed	0.00102 (0.01)	−0.00715 (−0.06)	−0.179 (−1.41)	−0.169 (−1.43)	0.0141 (0.10)	0.00645 (0.03)	−0.0184 (−0.22)	−0.0127 (−0.13)
Retired	−0.0696 (−0.91)	−0.0320 (−0.41)	−0.0176 (−0.30)	0.0379 (0.71)	0.127 (0.97)	0.159 (1.41)	−0.0309 (−0.51)	0.0362 (0.66)
Housewife	0.0188 (0.28)	0.00103 (0.02)	−0.194 (−1.34)	−0.266 (−1.92)	0.178 (1.98)	0.206* (2.06)	0.0973 (1.31)	0.0777 (0.89)
Student	0.102 (1.02)	0.0691 (0.76)	0.108 (0.78)	0.0217 (0.15)	0.0817 (0.93)	0.0491 (0.46)	0.0789 (1.17)	0.0378 (0.53)
Unemployed	−0.741** (−3.75)	−0.698*** (−3.90)	−0.521** (−3.63)	−0.480*** (−3.55)	−0.375** (−3.21)	−0.366** (−2.78)	−0.475*** (−5.67)	−0.446*** (−5.14)
One child	−0.0677 (−1.20)	−0.0501 (−0.90)	−0.0575 (−0.69)	−0.0336 (−0.33)	−0.0673 (−0.74)	−0.102 (−0.93)	−0.0942 (−1.66)	−0.0938 (−1.39)
Two children	−0.111 (−1.51)	−0.0993 (−1.43)	−0.0189 (−0.21)	0.0451 (0.39)	−0.0614 (−0.75)	−0.0469 (−0.43)	−0.0926 (−1.46)	−0.0666 (−0.90)
Three or more children	−0.0606 (−0.86)	−0.0657 (−0.92)	0.0374 (0.37)	0.0851 (0.68)	−0.0269 (−0.25)	−0.0489 (−0.35)	−0.00167 (−0.02)	−0.00823 (−0.10)
Living with parents	−0.0784 (−0.97)	−0.0588 (−0.74)	−0.0433 (−0.49)	−0.0145 (−0.15)	0.0357 (0.52)	−0.000802 (−0.01)	0.0302 (0.61)	0.0224 (0.43)
Age	−0.0680*** (−10.11)	−0.0690*** (−11.78)	−0.0960*** (−10.60)	−0.0908*** (−11.45)	−0.0495*** (−4.85)	−0.0505*** (−4.89)	−0.0733*** (−10.99)	−0.0738*** (−10.55)
Age ² /100	0.0756*** (11.59)	0.0762*** (11.44)	0.0899*** (8.53)	0.0848*** (10.25)	0.0557*** (4.43)	0.0565*** (4.44)	0.0768*** (10.75)	0.0773*** (10.09)
Education level	0.0296 (2.00)	0.0154 (1.31)	0.0745*** (4.17)	0.0589*** (3.88)	0.0404 (1.36)	0.0729*** (2.68)	0.0511** (2.91)	0.0542** (2.94)
Scale of income	0.0724** (4.28)	0.0655*** (3.85)	0.155** (4.07)	0.148** (4.38)	0.176*** (6.35)	0.185*** (5.95)	0.149*** (7.33)	0.148*** (6.69)
Constant	7.068*** (30.59)	7.354*** (38.23)	6.074*** (23.87)	6.661*** (27.98)	7.395*** (28.15)	10.15*** (10.97)	5.302*** (21.62)	7.203*** (23.37)
Observations	8989	8989	14,766	14,766	21,046	21,046	44,801	44,801
Adjusted R ²	0.134	—	0.176	—	0.146	—	0.281	—
F-statistic		166.22		74.74		32.98		136.29

t Statistics are in parentheses.

Regressors include control variables, year and country dummies, but coefficients are omitted for brevity. All the regressions include robust standard errors clustered by year and country.

* $p < 0.05$.** $p < 0.01$.*** $p < 0.001$.

satisfaction and a 21% lower happiness than those in the reference group (strongly agreeing). Similar to the results from the American's Changing Lives survey, the more people tend to agree with an optimistic view about the future, the higher their well-being.

Summarizing, regressions using different data from various countries, different years, and different wordings provide a consistent picture. Pessimistic (optimistic) expectations about the future are associated with lower (higher) current well-being. The tests of causality performed with the GSS, WVS and the ESS consistently suggest that the expectations about the very long-term future have an important impact on SWB.

6. Conclusion and Discussion

The discount rate is the most important parameter in economic analyses of climate change and other long-term policy questions.

Among economists, the contrast between the advocates of strong environmental policies and their opponents is rooted in different opinions on the long term discount rate, i.e. the extent to which current generations are willing to sacrifice their standards of life for the sake of future generations.

Such contrasting opinions are fed by limited amount of empirical evidence on the very long run discount rate. The question “how much do people care about future generations?” can hardly be answered through revealed preferences. Private markets provide information about societal evaluation of time within a generation, but there are no comparable private rates to evaluate events that will affect the next generations. Moreover, the idea that the discount rate is high is somewhat extreme, and appears to be reasonable only if one focuses only on the information from financial markets. A high discount rate implies that individuals are aware that the current economy is condemning future generations to be plagued by environmental crises. Simply stated, individuals are willing to spoil the future as the

Table 6

Description of the datasets and of the proxies of well-being and expectations about the future available for present study.

Dataset	Subjective well-being	Proxy for future expectations	Transformations of the proxy
World Value Survey (WVS)	<i>Satisfaction with your life</i> : “All things considered, how satisfied are you with your life as a whole these days? 1 Dissatisfied ... 10 Satisfied.” <i>Feeling of happiness</i> : “All things together, would you say you are: 1 Very happy, 2 Quite happy, 3 Not very happy, Not at all happy.”	<i>Humanity has a bright or bleak future</i> : “For each of the following pairs of statements, please tell me which one comes closest to your own views. A Humanity has a bright future; B Humanity has a bleak future. 1 Bright future, 2 Bleak future, 3 Both, 4 Neither, 5 Other.”	Recoded so that 0 is “Bright Future” and 1 is “Bleak Future”.
General Social Survey (GSS)	<i>Happiness</i> : “Taken all together, how would you say things are these days—would you say that you are 1 very happy, 2 pretty happy, or 3 not too happy?”	<i>No children with this future, agree or disagree</i> : “It’s hardly fair to bring children into the world with the way things look for the future. 1 Agree, 2 Disagree, 8 Don’t know.”	Recoded so that 0 is “Disagree” and 1 is “Agree”.
European Social Survey (ESS) — 2012	<i>Life Satisfaction</i> : “All things considered, how satisfied are you with your life as a whole nowadays? Please answer using this card, where 0 means ‘extremely dissatisfied’ and 10 means ‘extremely satisfied’.” <i>Happiness</i> : “Taking all things together, how happy would you say you are? Here 0 means you are extremely unhappy and 10 means you are extremely happy.”	<i>Hopeful about the future</i> : “Please, say to what extent you agree or disagree with each of the following statements. The way things are now, I find it hard to be hopeful about the future of the world.” where 1 means ‘agree strongly’ and 5 means ‘disagree strongly’.	Recoded so that 1 is ‘disagree strongly’ and 5 is ‘agree strongly’.
American’s Changing Lives (ACL) — Wave 4 (2002)	<i>Life Satisfaction</i> : “Now please think about your life as a whole. How satisfied are you with it - are you 1 completely satisfied, 2 very satisfied, 3 somewhat satisfied, 4 not very satisfied or 5 not at all satisfied.”	<i>Hopeless Future</i> : “The future seems hopeless to me and I can’t believe that things are changing for the better. 1 Agree strongly, 2 Agree Somewhat, 3 Disagree somewhat, 4 Disagree strongly.”	Recoded so that 1,2,3,4 become 4,3,2,1, respectively.
Eurobarometer 72.4 (Oct–Nov 2009)	<i>Life Satisfaction</i> : “On the whole, are you 1 very satisfied, 2 fairly satisfied, 3 not very satisfied or 4 not at all satisfied with your life?”	<i>Life for next generation</i> : “Generally speaking, do you think that the life of those who are children today will be 1 easier, 2 more difficult or 3 neither easier nor more difficult of those from your own generation?”	Recoded so that 2 is “Neither easier nor more difficult” and 3 is “more difficult” (with 1 remaining “Easier”).
German General Social Survey (2008)	<i>Life Satisfaction</i> : “Considering your life today, what would you say, on the whole, how happy or unhappy are you? 1 very happy, 2 pretty happy, 3 not really happy, 4 not happy at all, 8 I can’t say.”	<i>No children with this future, agree or disagree</i> : “Given the future, one can hardly take the responsibility for bringing children into the world. 1 I agree, 2 I disagree, 8 I don’t know.”	Recoded so that 0 is “I disagree” and 1 is “I agree”.
European Quality of Life Survey (EQLS) — 2007	<i>Life Satisfaction</i> : “All things considered, how satisfied would you say you are with your life these days? Please use a scale from 1 to 10 where 1 means ‘very dissatisfied’ and 10 means ‘very satisfied’.” <i>Happiness</i> : “Taking all things together on a scale of 1 to 10, how happy would you say you are? Here 1 means you are very unhappy and 10 means you are very happy.”	<i>Optimism about future</i> : “I am optimistic about the future. Please tell me whether you 1 strongly agree, 2 agree, 3 neither agree nor disagree, 4 disagree or 5 strongly disagree.”	Not recoded.

price to pay for current prosperity. They believe that unsustainability is the best option for the current generation.

This view contrasts with a large amount of research from various disciplines, including neuroscience, evolutionary biology and a large number of experiments. The studies point to pro-social behavior in human beings as biological features that allowed our evolutionary success. Some recent books characterized humankind as the “giraffes of altruism and reciprocity” (Keltner, 2008; de Waal, 1997); of ethics (Wright, 1995; Ridley, 1998; Haidt, 2013), and of cooperation (Tomasello, 2009; Bowles and Gintis, 2011). Just as giraffes developed long necks to survive, human beings evolved empathy, solidarity, moral feelings, and social intelligence. The view implied by a high discount rate, that people are intergenerationally selfish, sharply contrasts with the importance of pro-social behavior that is necessary for the survival of our species.

To overcome the limitations of market data, some researchers turned to stated preferences: individuals are asked about their

preferences for alternative scenarios describing trade-offs between current and future outcomes. However, this approach also has flaws. The main limitation is that responses may be driven by the desire to attain moral satisfaction.

We contribute to this literature by deriving information on very long-term time preferences from happiness data. In particular, we assess time preferences by estimating the relationship between individuals’ well-being and their expectations about the living conditions of future generations. If people are inter-temporally greedy, their expectations about the future should have weak or null influence on their current well-being. Conversely, such influence should be large and positive only if individuals care about future generations, i.e. they have a low discount rate. This approach allows us to overcome the main limitations of those used by previous researchers.

Using survey data, we proxy for people’s current well-being with SWB and expectations about the very long-term future

with specific questions on the issue. We run SWB regressions where the standard list of controls is augmented with perceptions about the future. Our results indicate that current well-being is sharply and negatively (positively) associated to a negative (positive) expectation about the future. The coefficient on people's expectations about the future is highly significant and comparable in size to other well-known correlates of people's well-being, such as marital status and unemployment. These results are consistent across different datasets, countries, years, and variable definitions. Where possible, we use 2SLS to account for possible endogeneity between expectations about the future and current well-being. We find that negative future expectations have a large negative impact on SWB. Income compensations for the loss of well-being associated with gloomy expectations about the living conditions of future generations are large, both in relative and absolute terms. The findings suggest that there is a substantial willingness to pay for preventing harm to future generations.

Our approach, which we refer to as derived preferences, does not use revealed preferences and it differs from the stated preferences approach, although it uses survey data. We do not use people's statements about their preferences for given hypothetical outcomes. Instead, we use questions about people's perceptions of the future, and we check how their preferences affect current well-being. In other words, we derive time preferences from the impact of future expectations on current well-being. This is why we use the term derived preferences. Our estimates are not biased by the limitations of stated preferences, i.e. the search for moral satisfaction, because the information we use does not concern the willingness of individuals and it does not assume their awareness of the link between future scenarios and present well-being.

Our estimates, however, are not without flaws. Although we address the endogeneity of expectations about the future, we do not address the endogeneity of income. There are systematic sources of both upward and downward bias that affect the estimates of the relationship between income and well-being. The estimates that instrument for income suggest that downward distortions tend to prevail and that the income coefficient in a happiness regression can be underestimated by two (Powdthavee, 2010b) or three times (Knight et al., 2009; Luttmer, 2005). We did not find suitable instruments for income, which implies that we probably overestimate the income necessary to compensate for the loss of well-being associated with negative expectations. This implies that our estimates of income compensation may be biased upward by two or three times. Yet, even under this circumstance, the necessary income for compensation remains substantial, and it implies a low long-term discount rate.

Another limitation relates to the estimate of a precise discount rate. Unfortunately, the data at hand do not allow us to compute a specific rate for two reasons. The first is that the length of the time implied by the questions about the expected future is ambiguous (the wording is about a generic distant future). Yet, future studies can easily overcome this limitation by administering surveys in which people are asked about a precise time span (e.g. 100 or 200 years). The second reason is that we do not have a common metric to compare current and future scenarios. Money or happiness could provide such a metric. For instance, the inclusion of questions asking respondents what average levels of GDP or happiness they expect in the distant future (after providing information to the respondents about current average levels of GDP or happiness) could provide the necessary information to compute the metrics. Moreover, the lack of common metrics also prevents us from assessing whether our results refer to the consumption discount rate or to its components defined by the standard Ramsey equation, such as the utility discount rate or the elasticity of the marginal utility of consumption.

However, we emphasize that such limitations depend on the available data and are not intrinsic to our approach. Nothing prevents researchers from providing precise estimates of the discount rate once more detailed data are collected. In conclusion, our contribution is two-fold: our results suggest that the very long-term discount rate is likely to be very low, and we illustrate a method to estimate the very long-term discount rate that overcomes the limitations imposed by market data and stated preferences.

Acknowledgments

This article reflects the view of the authors and do not engage in any way STATEC research, ANEC and funding partners. Francesco Sarracino gratefully acknowledges the support of the Observatoire de la Compétitivité, Ministère de l'Economie, DG Compétitivité, Luxembourg and STATEC. The authors are thankful to Kelsey O'Connor, Samuel Bowles, Marcello Basili, and Laurent Theis. The authors gratefully acknowledge also the constructive work of two anonymous reviewers. Possible errors or omissions are entirely the responsibility of the authors who contributed equally to this work.

Appendix A. Descriptive Statistics of the Sample of Developed Countries from the WVS.

Table A.7

Cross-tabulation of happiness and the expectations about the future.

	0 Bright future	1 Bleak future	Total
1 not at all happy	40	108	148
2 not very happy	297	698	995
3 quite happy	3906	3989	7895
4 very happy	2484	1570	4054
Total	6727	6365	13,092

Table A.8

Descriptive statistics of control variables.

Variable	Mean	Sd	Min	Max	Obs.
Female	0.519	0.500	0	1	17,463
Married	0.584	0.493	0	1	17,405
Living together as married	0.076	0.265	0	1	17,405
Divorced	0.053	0.224	0	1	17,405
Separated	0.019	0.137	0	1	17,405
Widowed	0.063	0.243	0	1	17,405
Retired	0.170	0.376	0	1	16,404
Housewife	0.115	0.319	0	1	16,404
Student	0.057	0.231	0	1	16,404
Unemployed	0.056	0.230	0	1	16,404
One child	0.141	0.348	0	1	17,330
Two children	0.286	0.452	0	1	17,330
Three or more children	0.267	0.442	0	1	17,330
Living with parents	0.140	0.347	0	1	15,000
Age	44.384	16.870	15	95	17,407
Age ² / 100	22.545	16.421	2.25	90.25	17,407
Education level	4.751	2.266	1	8	16,114
Income scale	5.489	2.737	1	10	15,180

Appendix B. Regressions with Various Estimation Methods on the Sample of Developed Countries

Table B.9

Estimates using ordered probit, ordered logit and OLS models on WVS data using life satisfaction as a dependent variable.

	Ordered probit	Ordered logit	OLS
Bleak future	−0.283*** (−8.44)	−0.469*** (−7.48)	−0.515*** (−8.42)
Woman	0.108*** (3.85)	0.194*** (3.90)	0.166** (3.64)
Married	0.376*** (5.93)	0.650*** (5.63)	0.664*** (5.88)
Living together	0.346*** (4.27)	0.609*** (4.48)	0.594** (4.02)
Divorced	0.0111 (0.16)	0.0178 (0.15)	0.0300* (0.24)
Separated	−0.311*** (−4.93)	−0.629*** (−6.07)	−0.643*** (−5.57)
Widowed	0.000789 (0.01)	−0.0349 (−0.27)	0.00102 (0.01)
Retired	−0.0183 (−0.42)	−0.0444 (−0.50)	−0.0696 (−0.91)
Housewife	0.0141 (0.38)	0.0513 (0.93)	0.0188 (0.28)
Student	0.0696 (1.17)	0.114 (1.09)	0.102 (1.02)
Unemployed	−0.375*** (−3.72)	−0.685*** (−3.73)	−0.741** (−3.75)
One child	−0.0308 (−0.97)	−0.0673 (−1.10)	−0.0677 (−1.20)
Two children	−0.0666 (−1.65)	−0.112 (−1.68)	−0.111 (−1.51)
Three or more children	−0.0316 (−0.82)	−0.0570 (−0.86)	−0.0606 (−0.86)
Living with parents	−0.0352 (−0.79)	−0.0452 (−0.57)	−0.0784 (−0.97)
Age	−0.0374*** (−7.58)	−0.0675*** (−7.30)	−0.0680*** (−10.11)
Age ² / 100	0.0429*** (8.32)	0.0775*** (7.88)	0.0756*** (11.59)
Education level	0.0117 (1.27)	0.0262 (1.57)	0.0296 (2.00)
Scale of income	0.0379*** (3.99)	0.0608*** (3.60)	0.0724** (4.28)
Observations	8989	8989	8989
Adjusted R ²			0.134
Pseudo R ²	0.036	0.038	

t Statistics are in parentheses.

Regressors include both year and country dummies, but coefficients are omitted for brevity.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Table B.10

Estimates using ordered probit, ordered logit and OLS models on WVS data using happiness as a dependent variable.

	Ordered probit	Ordered logit	OLS
Bleak future	−0.343*** (−10.37)	−0.574*** (−9.57)	−0.171*** (−8.49)
Woman	0.147*** (3.78)	0.257*** (3.74)	0.0711** (3.62)
Married	0.594*** (13.43)	1.041*** (13.02)	0.294*** (16.60)
Living together	0.477*** (10.42)	0.850*** (10.75)	0.240*** (10.08)
Divorced	0.0397 (0.70)	0.0920 (0.92)	0.00862 (0.29)
Separated	−0.115 (−1.87)	−0.235 (−1.90)	−0.0697 (−1.94)
Widowed	−0.0219 (−0.24)	−0.0738 (−0.36)	−0.0312 (−0.60)

Table B.10 (continued)

	Ordered probit	Ordered logit	OLS
Retired	−0.0369 (−0.55)	−0.0685 (−0.56)	−0.0228 (−0.64)
Housewife	−0.0296 (−0.56)	−0.0245 (−0.27)	−0.0173 (−0.68)
Student	0.0730 (0.84)	0.142 (0.90)	0.0347 (0.83)
Unemployed	−0.273* (−2.30)	−0.500* (−2.17)	−0.152 (−2.21)
One child	−0.121*** (−3.64)	−0.219*** (−3.57)	−0.0622** (−3.92)
Two children	−0.0527 (−1.35)	−0.103 (−1.50)	−0.0256 (−1.30)
Three or more children	−0.0510 (−0.98)	−0.103 (−1.02)	−0.0232 (−0.91)
Living with parents	0.0776* (1.98)	0.135 (1.87)	0.0399 (2.07)
Age	−0.0341*** (−4.72)	−0.0584*** (−4.33)	−0.0173*** (−5.04)
Age ² / 100	0.0315*** (4.25)	0.0548*** (4.00)	0.0160** (4.54)
Education level	0.0115* (2.07)	0.0173 (1.62)	0.00607 (2.23)
Scale of income	0.0241** (2.64)	0.0372* (2.37)	0.0116* (2.47)
Observations	8965	8965	8965
Adjusted R ²			0.138
Pseudo R ²	0.080	0.079	

t Statistics are in parentheses.

Regressors include both year and country dummies, but coefficients are omitted for brevity.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Appendix C. Happiness Regressions

Table C.11

Expectations about the future and happiness in developed countries using WVS data.

	Happiness
Bleak future	−0.171*** (−8.49)
Woman	0.0711** (3.62)
Married	0.294*** (16.60)
Living together	0.240*** (10.08)
Divorced	0.00862 (0.29)
Separated	−0.0697 (−1.94)
Widowed	−0.0312 (−0.60)
Retired	−0.0228 (−0.64)
Housewife	−0.0173 (−0.68)
Student	0.0347 (0.83)
Unemployed	−0.152 (−2.21)
One child	−0.0622** (−3.92)
Two children	−0.0256 (−1.30)
Three or more children	−0.0232 (−0.91)
Living with parents	0.0399 (2.07)
Age	−0.0173*** (−5.04)
Age ² / 100	0.0160** (4.54)
Education level	0.00607 (2.23)
Scale of income	0.0116* (2.47)
Constant	3.310*** (43.13)
Observations	8965
Adjusted R ²	0.138

t Statistics are in parentheses.

Regressors include both year and country dummies, but coefficients are omitted for brevity.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Table C.12

Instrumenting the expectations about the future using political distrust. The sample includes the developed countries from the WVS.

Dependent variable	Reduced form	OLS	2SLS
	Bleak future	Happiness	Happiness
Bleak future		−0.171*** (−8.49)	−0.289*** (−3.64)
Political distrust	0.176*** (12.93)		
Woman	0.0279 (1.01)	0.0711** (3.62)	0.0750*** (3.65)
Married	−0.0208 (−1.41)	0.294*** (16.60)	0.291*** (16.05)
Living together	0.00867 (0.44)	0.240*** (10.08)	0.241*** (11.17)
Divorced	0.0407 (1.57)	0.00862 (0.29)	0.0135 (0.46)
Separated	−0.0784 (−1.53)	−0.0697 (−1.94)	−0.0787* (−2.38)
Widowed	−0.000778 (−0.03)	−0.0312 (−0.60)	−0.0325 (−0.65)
Retired	0.0514 (2.18)	−0.0228 (−0.64)	−0.0169 (−0.49)
Housewife	−0.0190 (−1.05)	−0.0173 (−0.68)	−0.0198 (−0.81)
Student	−0.0349 (−1.51)	0.0347 (0.83)	0.0298 (0.77)
Unemployed	0.0503* (2.89)	−0.152 (−2.21)	−0.145* (−2.28)
One child	0.0169 (0.67)	−0.0622** (−3.92)	−0.0593*** (−3.72)
Two children	0.0106 (1.11)	−0.0256 (−1.30)	−0.0236 (−1.27)
Three or more children	−0.00781 (−0.39)	−0.0232 (−0.91)	−0.0239 (−0.97)
Living with parents	0.0275 (1.08)	0.0399 (2.07)	0.0431* (2.56)
Age	−0.00144 (−0.51)	−0.0173*** (−5.04)	−0.0174*** (−5.66)
Age ² / 100	0.000905 (0.32)	0.0160** (4.54)	0.0161*** (4.91)
Education level	−0.0175** (−4.14)	0.00607 (2.23)	0.00393 (1.81)
Scale of income	−0.00783* (−2.67)	0.0116* (2.47)	0.0106* (2.48)
Constant	0.491*** (7.33)	3.310*** (43.13)	3.353*** (47.33)
Observations	9008	8965	8965
Adjusted R ²	0.134	0.138	—
F-statistics			164.39

t Statistics are in parentheses.

Regressors include both year and country dummies, but coefficients are omitted for brevity.

* $p < 0.05$.** $p < 0.01$.*** $p < 0.001$.**Appendix D. Regression Including all the Countries in the WVS****Table D.13**

Availability of WVS data across countries and over time.

	1994	1995	1996	1997	1998	1999	2004	Total
Albania	0	0	0	0	999	0	0	999
Azerbaijan	0	0	0	2002	0	0	0	2002
Argentina	0	1079	0	0	0	0	0	1079
Australia	0	2048	0	0	0	0	0	2048
Bangladesh	0	0	1525	0	0	0	0	1525
Armenia	0	0	0	2000	0	0	0	2000
Bosnia and Herzegovina	0	0	0	0	1200	0	0	1200
Brazil	0	0	0	1149	0	0	0	1149
Bulgaria	0	0	0	1072	0	0	0	1072
Belarus	0	0	2092	0	0	0	0	2092

(continued on next page)

Table D.13 (continued)

	1994	1995	1996	1997	1998	1999	2004	Total
Chile	0	0	1000	0	0	0	0	1000
China	0	1500	0	0	0	0	0	1500
Taiwan	780	0	0	0	0	0	0	780
Colombia	0	0	0	3029	2996	0	0	6025
Croatia	0	0	1196	0	0	0	0	1196
Czech Republic	0	0	0	0	1147	0	0	1147
Dominican Republic	0	0	417	0	0	0	0	417
El Salvador	0	0	0	0	0	1254	0	1254
Estonia	0	0	1021	0	0	0	0	1021
Finland	0	0	987	0	0	0	0	987
Georgia	0	0	2008	0	0	0	0	2008
Germany	0	0	0	2026	0	0	0	2026
Hungary	0	0	0	0	650	0	0	650
India	0	2040	0	0	0	0	0	2040
Japan	0	1054	0	0	0	0	0	1054
South Korea	0	0	1249	0	0	0	0	1249
Latvia	0	0	1200	0	0	0	0	1200
Lithuania	0	0	0	1009	0	0	0	1009
Mexico	0	0	2364	0	0	0	0	2364
Moldova	0	0	984	0	0	0	0	984
New Zealand	0	0	0	0	1201	0	954	2155
Nigeria	0	1996	0	0	0	0	0	1996
Norway	0	0	1127	0	0	0	0	1127
Pakistan	0	0	0	733	0	0	0	733
Peru	0	0	1211	0	0	0	0	1211
Philippines	0	0	1200	0	0	0	0	1200
Poland	0	0	0	1153	0	0	0	1153
Puerto Rico	0	1164	0	0	0	0	0	1164
Romania	0	0	0	0	1239	0	0	1239
Russian Federation	0	2040	0	0	0	0	0	2040
Slovakia	0	0	0	0	1095	0	0	1095
Slovenia	0	1007	0	0	0	0	0	1007
South Africa	0	0	2935	0	0	0	0	2935
Spain	0	1211	0	0	0	0	0	1211
Sweden	0	0	1009	0	0	0	0	1009
Switzerland	0	0	1212	0	0	0	0	1212
Turkey	0	0	1907	0	0	0	0	1907
Ukraine	0	0	2811	0	0	0	0	2811
Macedonia	0	0	0	0	995	0	0	995
Great Britain	0	0	0	0	1093	0	0	1093
United States	0	1542	0	0	0	0	0	1542
Uruguay	0	0	1000	0	0	0	0	1000
Venezuela	0	0	1200	0	0	0	0	1200
Serbia and Montenegro	0	0	1520	0	0	0	0	1520
Total	780	16,681	33,175	14,173	12,615	1254	954	79,632

Table D.14

List of all countries available in the WVS organized in developed, developing and transition countries.

Developed countries	Developing countries	Transition economies
Australia	Argentina	Albania
Taiwan	Bangladesh	Azerbaijan
Finland	Brazil	Armenia
Germany	Chile	Bosnia and Herzegovina
Japan	China	Bulgaria
South Korea	Colombia	Belarus
New Zealand	Dominican Republic	Croatia
Norway	El Salvador	Czech Republic
Spain	India	Estonia
Sweden	Mexico	Georgia
Switzerland	Nigeria	Hungary
Great Britain	Pakistan	Latvia
United States	Peru	Lithuania
	Puerto Rico	Moldova
	South Africa	Poland
	Turkey	Romania
	Uruguay	Russian Federation
	Venezuela	Slovakia
	Serbia and Montenegro	Slovenia
		Ukraine
		Macedonia

Table D.15

Expectations about the future and happiness considering various groups of countries in the WVS.

	Developed countries		Transition countries		Developing countries		All countries	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
Bleak future	−0.171*** (−8.49)	−0.289*** (−3.64)	−0.245*** (−17.50)	−0.849*** (−6.32)	−0.136*** (−5.55)	−0.777* (−2.23)	−0.178*** (−11.22)	−0.643*** (−4.17)
Woman	0.0711** (3.62)	0.0750*** (3.65)	−0.00678 (−0.70)	−0.00618 (−0.54)	0.0236 (1.34)	0.0257 (1.68)	0.0226* (2.17)	0.0276* (2.40)
Married	0.294*** (16.60)	0.291*** (16.05)	0.195*** (7.16)	0.194*** (5.97)	0.170*** (5.95)	0.174*** (5.56)	0.204*** (10.55)	0.203*** (9.88)
Living together	0.240*** (10.08)	0.241*** (11.17)	0.105** (3.90)	0.111*** (4.00)	0.0561 (1.22)	0.0561 (1.42)	0.103*** (3.56)	0.102*** (3.93)
Divorced	0.00862 (0.29)	0.0135 (0.46)	−0.134*** (−4.32)	−0.119*** (−3.50)	−0.0848 (−1.60)	−0.0516 (−1.11)	−0.0828** (−2.96)	−0.0617* (−2.24)
Separated	−0.0697 (−1.94)	−0.0787* (−2.38)	−0.131 (−1.68)	−0.106 (−1.39)	−0.0979 (−1.88)	−0.0756 (−1.39)	−0.0938** (−2.79)	−0.0885* (−2.42)
Widowed	−0.0312 (−0.60)	−0.0325 (−0.65)	−0.0795* (−2.19)	−0.0772* (−2.38)	−0.0863 (−1.86)	−0.0889 (−1.54)	−0.0768** (−2.80)	−0.0763** (−2.60)
Retired	−0.0228 (−0.64)	−0.0169 (−0.49)	−0.00373 (−0.13)	0.0125 (0.43)	0.0466 (1.05)	0.0534 (1.26)	−0.00318 (−0.14)	0.0140 (0.63)
Housewife	−0.0173 (−0.68)	−0.0198 (−0.81)	−0.0173 (−0.54)	−0.0364 (−1.08)	0.0544 (1.42)	0.0622 (1.64)	0.0277 (1.06)	0.0236 (0.84)
Student	0.0347 (0.83)	0.0298 (0.77)	0.0206 (0.75)	−0.00202 (−0.07)	0.0183 (1.00)	0.00867 (0.49)	0.0273 (1.91)	0.0166 (1.19)
Unemployed	−0.152 (−2.21)	−0.145* (−2.28)	−0.135*** (−4.16)	−0.124*** (−4.13)	−0.0808* (−2.73)	−0.0800* (−2.41)	−0.107*** (−5.12)	−0.100*** (−4.57)
One child	−0.0622** (−3.92)	−0.0593*** (−3.72)	0.00445 (0.20)	0.00973 (0.40)	−0.0461 (−1.33)	−0.0564 (−1.46)	−0.0403* (−2.14)	−0.0405 (−1.94)
Two children	−0.0256 (−1.30)	−0.0236 (−1.27)	0.0382 (1.62)	0.0534* (2.05)	−0.0574 (−1.56)	−0.0549 (−1.30)	−0.0259 (−1.25)	−0.0199 (−0.85)
Three or more children	−0.0232 (−0.91)	−0.0239 (−0.97)	0.0464 (1.66)	0.0565* (2.00)	−0.0988 (−2.01)	−0.105* (−2.01)	−0.0412 (−1.50)	−0.0435 (−1.48)
Living with parents	0.0399 (2.07)	0.0431* (2.56)	0.0149 (0.76)	0.0238 (1.05)	0.0196 (0.77)	0.00881 (0.33)	0.0264 (1.65)	0.0242 (1.43)
Age	−0.0173*** (−5.04)	−0.0174*** (−5.66)	−0.0244*** (−8.09)	−0.0228*** (−7.45)	−0.0132*** (−4.36)	−0.0136*** (−4.69)	−0.0177*** (−8.32)	−0.0179*** (−8.37)
Age ² / 100	0.0160** (4.54)	0.0161*** (4.91)	0.0207*** (5.77)	0.0191*** (5.66)	0.0140*** (4.46)	0.0144*** (4.79)	0.0167*** (7.85)	0.0168*** (7.69)
Education level	0.00607 (2.23)	0.00393 (1.81)	0.0200*** (4.62)	0.0155*** (4.57)	0.0148* (2.55)	0.0231*** (3.89)	0.0156*** (4.37)	0.0163*** (4.05)
Scale of income	0.0116* (2.47)	0.0106* (2.48)	0.0285*** (4.42)	0.0266*** (4.90)	0.0356*** (5.19)	0.0375*** (5.03)	0.0292*** (6.41)	0.0288*** (5.66)
Constant	3.310*** (43.13)	3.353*** (47.33)	2.928*** (51.26)	2.715*** (43.02)	3.397*** (45.01)	3.868*** (12.74)	3.223*** (58.09)	3.364*** (40.77)
Observations	8965	8965	14,647	14,647	21,558	21,558	45,170	45,170
Adjusted R ²	0.138	—	0.156	—	0.089	—	0.210	—
F-statistic		164.39		72.35		31.1		131.28

t Statistics are in parentheses.

Regressors include control variables, year and country dummies, but coefficients are omitted for brevity. All the regressions include robust standard errors clustered by year and country.

* $p < 0.05$.** $p < 0.01$.*** $p < 0.001$.**Appendix E. Models with Interaction Terms for Sub-groups of the Sample****Table E.16**

Models with interaction terms for life satisfaction on all countries using the World Values Surveys.

	Gender		Marital status		Education		Age		Children	
Bleak future	−0.546*** (−7.15)		−0.695*** (−8.51)		−0.369** (−2.77)		−0.717*** (−8.13)		−0.706*** (−9.41)	
Woman	0.0850 (1.94)		0.0505 (1.43)		0.0498 (1.42)		0.0487 (1.37)		0.0503 (1.43)	
Woman * bleak	−0.0735 (−1.41)									
Married	0.408*** (6.06)		0.325*** (4.85)		0.407*** (6.08)		0.380*** (5.74)		0.422*** (6.29)	
Divorced	−0.164* (−2.06)		−0.0875 (−0.81)		−0.165* (−2.08)		−0.224** (−2.74)		−0.152 (−1.90)	
Widowed	−0.0619 (−0.76)		−0.0962 (−0.93)		−0.0639 (−0.79)		−0.0321 (−0.40)		−0.0393 (−0.49)	
Vocational	0.186 (1.93)		0.185 (1.94)		0.343* (2.63)		0.183 (1.94)		0.188 (1.97)	
Secondary	0.193 (1.56)		0.193 (1.57)		0.309* (2.24)		0.196 (1.61)		0.195 (1.59)	
University	0.299* (2.66)		0.298* (2.66)		0.399** (3.00)		0.289* (2.58)		0.305** (2.72)	
One child	−0.0818 (−1.43)		−0.0798 (−1.39)		−0.0788 (−1.40)		−0.0903 (−1.58)		−0.157* (−2.34)	
Two children	−0.0788 (−1.25)		−0.0783 (−1.25)		−0.0777 (−1.25)		−0.120 (−1.95)		−0.150 (−2.01)	
Three or more children	0.00704 (0.10)		0.00999 (0.14)		0.00923 (0.13)		−0.0546 (−0.80)		−0.0651 (−0.80)	

(continued on next page)

Table E.16 (continued)

	Gender		Marital status		Education		Age		Children	
Living with parents	0.0278	(0.55)	0.0285	(0.56)	0.0264	(0.52)	0.0528	(1.04)	0.0239	(0.47)
Age	−0.0707***	(−10.29)	−0.0705***	(−10.32)	−0.0706***	(−10.35)			−0.0754***	(−7.77)
Age ² / 100	0.0749***	(10.37)	0.0747***	(10.35)	0.0747***	(10.37)	−0.00411	(−1.22)	0.0775***	(7.67)
Scale of income	0.152***	(7.26)	0.153***	(7.30)	0.153***	(7.25)	0.150***	(7.14)	0.152***	(7.30)
Married * bleak			0.172**	(3.18)						
Divorced * bleak			−0.115	(−1.12)						
Widowed * bleak			0.0760	(0.65)						
Vocational * bleak					−0.337*	(−2.62)				
Secondary * bleak					−0.250**	(−2.96)				
University * bleak					−0.219	(−1.84)				
25 < age < 50							−0.411***	(−8.08)	−0.0145	(−0.24)
50 < age < 75							−0.242**	(−3.00)	0.113	(1.30)
Age > 75							0.113	(0.72)	−0.0672	(−0.45)
25 < age < 50 * bleak							0.167*	(2.41)		
50 < age < 75 * bleak							0.123	(1.49)		
Age > 75 * bleaks							0.263	(1.37)		
Having children * bleak									0.164**	(2.74)
Constant	5.288***	(19.66)	5.354***	(19.69)	5.206***	(18.25)	4.243***	(19.03)	5.475***	(18.92)
Observations	44,801		44,801		44,801		44,801		44,801	
Adjusted R ²	0.281		0.281		0.281		0.279		0.281	

t Statistics are in parentheses.

Regressors include control variables, year and country dummies, but coefficients are omitted for brevity.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Table E.17

Models with interaction terms for happiness on all countries using the World Values Surveys.

	Gender		Marital status		Education		Age		Children	
Bleak future	−0.178***	(−10.34)	−0.174***	(−8.51)	−0.167***	(−4.78)	−0.175***	(−8.52)	−0.177***	(−10.41)
Woman	0.0252	(2.02)	0.0239*	(2.26)	0.0238*	(2.26)	0.0239*	(2.23)	0.0238*	(2.26)
Woman * bleak	−0.00288	(−0.21)								
Married	0.181***	(9.47)	0.180***	(10.49)	0.181***	(9.48)	0.175***	(9.02)	0.185***	(9.36)
Divorced	−0.0970***	(−3.96)	−0.0773*	(−2.49)	−0.0971***	(−3.98)	−0.110***	(−4.44)	−0.0935***	(−3.82)
Widowed	−0.0934**	(−3.49)	−0.0459	(−1.47)	−0.0936**	(−3.51)	−0.0854**	(−3.12)	−0.0877**	(−3.18)
Vocational	0.0779**	(3.37)	0.0778**	(3.35)	0.0908**	(2.76)	0.0766**	(3.34)	0.0790**	(3.42)
Secondary	0.0800**	(3.02)	0.0799**	(3.00)	0.0844**	(2.78)	0.0797**	(3.05)	0.0807**	(3.06)
University	0.0995***	(4.17)	0.0994***	(4.16)	0.104**	(3.20)	0.0970***	(4.06)	0.102***	(4.26)
Child	−0.0356	(−1.29)	−0.0359	(−1.30)	−0.0354	(−1.29)	−0.0370*	(−2.09)	−0.0321	(−1.67)
One child	0.0000102	(0.00)	0.000299	(0.02)	0.0000636	(0.00)				
Two children	0.0155	(1.26)	0.0157	(1.28)	0.0154	(1.26)	0.00814	(0.68)	0.0163	(1.36)
Living with parents	0.0249	(1.56)	0.0252	(1.58)	0.0248	(1.56)	0.0308	(1.95)	0.0236	(1.47)
Age	−0.0167***	(−7.43)	−0.0167***	(−7.50)	−0.0167***	(−7.46)			−0.0173***	(−5.99)
Age ² / 100	0.0161***	(7.32)	0.0161***	(7.36)	0.0161***	(7.33)	−0.00221*	(−2.07)	0.0166***	(5.71)
Scale of income	0.0304***	(6.44)	0.0303***	(6.47)	0.0304***	(6.44)	0.0297***	(6.34)	0.0302***	(6.45)
Married * bleak			0.00374	(0.19)						
Divorced * bleak			−0.0344	(−1.23)						
Widowed * bleak			−0.0901*	(−2.48)						
Vocational * bleak					−0.0274	(−0.82)				
Secondary * bleak					−0.00947	(−0.37)				
University * bleak					−0.00919	(−0.27)				
25 < age < 50							−0.0941***	(−5.20)	−0.0157	(−0.90)
50 < age < 75							−0.0414	(−1.17)	0.00754	(0.24)
Age > 75							0.0722	(1.04)	−0.0484	(−0.99)
25 < age < 50 * bleak							0.0132	(0.76)		
50 < age < 75 * bleak							−0.0389	(−1.71)		
Age > 75 * bleaks							−0.0901	(−1.21)		
Having children * bleak									−0.00336	(−0.18)
Constant	3.213***	(53.34)	3.211***	(54.22)	3.207***	(48.12)	2.952***	(75.99)	3.235***	(51.89)
Observations	45,170		45,170		45,170		45,170		45,170	
Adjusted R ²	0.210		0.210		0.210		0.209		0.210	

t Statistics are in parentheses.

Regressors include control variables, year and country dummies, but coefficients are omitted for brevity.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Appendix F. Estimations Using Different Data-sets

Table F.18

General Social Survey, Ordered probit estimates for happiness.

	(1)	(2)	(3)
Unfair to give birth to child	−0.360*** (−21.45)	−0.361*** (−21.42)	−0.279*** (−14.85)
Woman			0.166*** (8.37)
Married			0.387*** (12.60)
Widowed			−0.205*** (−4.48)
Divorced			−0.115** (−3.01)
Separated			−0.255*** (−4.58)
Part-time			−0.0385 (−1.28)
Temporary no work			−0.136* (−2.34)
Unemployed			−0.396*** (−7.31)
Retired			0.0184 (0.47)
School			0.0777 (1.44)
Housekeeping			−0.0598* (−2.11)
Other			−0.178* (−2.05)
One child			−0.141*** (−4.63)
Two children			−0.0747* (−2.43)
Three or more children			−0.100** (−3.10)
Age of respondent			−0.0167*** (−4.62)
Age ² / 100			0.0232*** (6.12)
Degree			0.0173* (1.96)
Inflation-adjusted family income (log)			0.151*** (12.45)
Number of persons in household			−0.0135 (−1.84)
Cut1	−1.317*** (−98.97)	−1.366*** (−41.81)	0.141 (1.00)
Cut2	0.314*** (28.52)	0.267*** (8.45)	1.873*** (13.25)
Observations	19,665	19,665	17,972
Pseudo R ²	0.013	0.014	0.054

Marginal effects; *t* statistics are in parentheses.

(1) The only regressor is the expectation about the future

(2) and (3) Regressors include year dummies, but coefficients are omitted for brevity.

(d) for discrete change of dummy variable from 0 to 1.

* $p < 0.05$.** $p < 0.01$.*** $p < 0.001$.**Table F.19**

U.S. General Social Survey, IV estimates for happiness: using confidence in the scientific community and in Congress as instrumental variables for the expectations about the future.

	OLS	Reduced form One instrument	2SLS One instrument	Reduced form Two instruments	2SLS Two instruments
Unfair to give birth to child	−0.148*** (−14.82)		−0.754*** (−5.38)		−1.077*** (−7.66)
Woman	0.0875*** (8.40)	0.0737** (2.69)	0.124*** (8.78)	0.0786** (2.85)	0.132*** (8.41)
Married	0.206*** (12.69)	−0.0413 (−0.95)	0.193*** (9.04)	−0.0447 (−1.02)	0.187*** (7.81)
Widowed	−0.108*** (−4.44)	−0.0126 (−0.20)	−0.122*** (−3.71)	−0.0136 (−0.22)	−0.120** (−3.24)

(continued on next page)

Table F.19 (continued)

	OLS	Reduced form One instrument	2SLS One instrument	Reduced form Two instruments	2SLS Two instruments
Divorced	−0.0624** (−3.06)	0.0799 (1.47)	−0.0471 (−1.72)	0.0694 (1.27)	−0.0405 (−1.33)
Separated	−0.140*** (−4.67)	0.203** (2.69)	−0.0725 (−1.77)	0.201** (2.66)	−0.0479 (−1.06)
Part-time	−0.0209 (−1.31)	−0.203*** (−4.78)	−0.0709** (−3.02)	−0.201*** (−4.72)	−0.0966*** (−3.75)
Temporary no work	−0.0725* (−2.34)	0.00382 (0.05)	−0.0866* (−2.09)	0.0117 (0.15)	−0.0821 (−1.79)
Unemployed	−0.215*** (−7.41)	0.114 (1.64)	−0.197*** (−5.51)	0.113 (1.62)	−0.180*** (−4.56)
Retired	0.00912 (0.44)	0.0546 (1.03)	0.0371 (1.30)	0.0554 (1.04)	0.0429 (1.34)
School	0.0409 (1.42)	−0.282*** (−3.79)	−0.0271 (−0.70)	−0.281*** (−3.75)	−0.0674 (−1.61)
Housekeeping	−0.0327* (−2.20)	−0.0734* (−1.97)	−0.0651** (−3.29)	−0.0722 (−1.93)	−0.0715** (−3.24)
Other	−0.0972* (−2.09)	−0.114 (−1.03)	−0.137* (−2.26)	−0.0782 (−0.70)	−0.138* (−2.08)
One child	−0.0743*** (−4.64)	−0.00184 (−0.04)	−0.0675** (−3.24)	−0.00124 (−0.03)	−0.0680** (−2.91)
Two children	−0.0396* (−2.46)	−0.00400 (−0.10)	−0.0258 (−1.24)	−0.00330 (−0.08)	−0.0278 (−1.19)
Three or more children	−0.0534** (−3.13)	−0.0562 (−1.29)	−0.0477* (−2.12)	−0.0497 (−1.13)	−0.0530* (−2.12)
Age of respondent	−0.00889*** (−4.64)	0.0121* (2.45)	−0.00639* (−2.36)	0.0122* (2.45)	−0.00460 (−1.52)
Age ² / 100	0.0123*** (6.17)	−0.0132* (−2.54)	0.0101*** (3.52)	−0.0134* (−2.57)	0.00810* (2.52)
Degree	0.00891 (1.95)	−0.293*** (−22.08)	−0.0556*** (−3.66)	−0.294*** (−22.09)	−0.0884*** (−5.72)
Inflation-adjusted family income (log)	0.0803*** (12.48)	−0.194*** (−11.89)	0.0393** (2.95)	−0.197*** (−11.96)	0.0145 (1.04)
Number of persons in household	−0.00699 (−1.79)	0.0102 (1.06)	−0.00366 (−0.73)	0.0108 (1.12)	−0.00168 (−0.30)
Confidence in scientific community		0.198*** (10.22)		0.171*** (8.47)	
Confidence in congress				0.103*** (5.16)	
Constant	1.468*** (19.66)	1.343*** (7.10)	2.099*** (11.38)	1.220*** (6.37)	2.472*** (13.01)
Observations	17,972	12,795	12,724	12,687	12,617
Adjusted R ²	0.096				
F-statistic		107.76		66.34	
J-statistic					27.34

t Statistics are in parentheses.

Regressors include year dummies, but coefficients are omitted for brevity.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Table F.20

American's Changing Lives W4 (2002), Ordered probit estimates for life satisfaction.

	(1)	(2)
futhop==2	−0.270*** (−4.28)	−0.322*** (−4.90)
futhop==3	−0.437*** (−5.08)	−0.562*** (−6.11)
futhop==4	−0.498*** (−3.59)	−0.589*** (−4.13)
Female		0.000229 (0.00)
Married		0.256** (2.65)
Separated		−0.0389 (−0.22)
Divorced		−0.254* (−2.22)
Widowed		−0.0800 (−0.63)
Unemployed		−0.397** (−2.66)
Retired		−0.0750 (−0.89)
Disabled		−0.456** (−2.84)
Housekeeping		−0.0407 (−0.40)
Student		0.0123 (0.02)
Age		0.0157 (1.06)
Age ² / 100		0.000468 (0.03)
9 < educ ≤ 11 years		−0.175 (−1.25)
Educ = 12 years		−0.249* (−1.96)
13 < educ ≤ 15 years		−0.350** (−2.69)

Table F.20 (continued)

	(1)	(2)	
Educ > 16 years		–0.283*	(–2.14)
Observations	1656	1654	
Pseudo R ²	0.012	0.043	

Marginal effects; *t* statistics in parentheses.

Variable of interest:

The future seems hopeless to me and I can't believe that things are changing for the better.

The variable ranges on a scale where 1 Strongly disagree and 4 Strongly agree.

(d) for discrete change of dummy variable from 0 to 1.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Table F.21

Eurobarometer 72.4 (Oct–Nov 2009), Ordered probit estimates for life satisfaction.

	(1)		(2)		(3)	
lifefut==2	−0.0545**	(−2.79)	−0.0849***	(−4.09)	−0.101***	(−4.79)
lifefut==3	−0.150***	(−9.04)	−0.251***	(−13.87)	−0.214***	(−11.55)
Woman					0.0333*	(2.43)
Married					0.257***	(11.87)
Living with partner					0.119***	(4.25)
Divorced					−0.105**	(−3.29)
Widowed					−0.0579	(−1.75)
Student					0.507***	(12.14)
Unemployed					−0.584***	(−22.90)
Retired					−0.0628**	(−2.71)
Age					−0.0432***	(−15.98)
Age ² / 100					0.0415***	(15.21)
15 years					0.0822*	(2.49)
16 years					0.160***	(4.93)
17 years					0.160***	(4.95)
18 years					0.276***	(10.35)
19 years					0.318***	(10.23)
20 years					0.298***	(7.97)
21 years					0.433***	(10.33)
22+ years					0.522***	(19.02)
No full-time education					−0.139*	(−2.03)
Cut1	−1.562***	(−91.47)	−1.996***	(−48.91)	−2.684***	(−34.92)
Cut2	−0.738***	(−48.95)	−1.056***	(−26.85)	−1.687***	(−22.25)
Cut3	0.727***	(48.25)	0.658***	(16.82)	0.111	(1.48)
Observations	29,011		29,011		28,488	
Pseudo R ²	0.001		0.108		0.142	

Marginal effects; *t* statistics are in parentheses.

Variable of interest:

Generally speaking, do you think that the life of those who are children today will be easier, more difficult or neither easier nor more difficult than the life of those from your own generation? 1 is Easier, 2 Neither easier nor more difficult, and 3 is more difficult.

(1) The only regressor is the expectation about the future; (2) and (3) Regressors include only country dummies, but coefficients are omitted for brevity. (d) for discrete change of dummy variable from 0 to 1.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Table F.22

ALLBUS – German General Social Survey, Ordered probit estimates for life satisfaction.

	(1)		(2)	
Life satisfaction				
No more children with this future	−0.457***	(−7.69)	−0.364***	(−5.26)
Woman			−0.0234	(−0.32)
Married			0.412***	(3.50)
Separated			−0.911***	(−4.09)
Widowed			−0.0816**	(−0.48)
Divorced			−0.0393	(−0.26)
Part-time emp.			0.00672*	(0.05)
Along-side job			0.263	(1.75)
Unemployed			−0.0481	(−0.52)
Number of persons in household			−0.000608	(−0.02)
Age			−0.0473***	(−3.65)
Age ² / 100			0.0427***	(3.39)
Degree			0.0391	(1.36)

(continued on next page)

Table F.22 (continued)

	(1)	(2)	
Net household income (log)		0.322***	(4.84)
Observations	1605	1296	
Pseudo R^2	0.021	0.080	

Marginal effects; t statistics are in parentheses.

Variable of interest:

Given the future, one can hardly take responsibility to bring children into the world. 1 is agree and 0 is disagree.

(1) The only regressor is the variable of interest. (2) Regressors also include control variables.

(d) for discrete change of dummy variable from 0 to 1.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Table F.23

European Quality of Life – Sept-2008, OLS estimates for life satisfaction.

	(1)		(2)		(3)	
futopt==2	−0.608***	(−18.90)	−0.524***	(−16.94)	−0.531***	(−14.26)
futopt==3	−1.499***	(−42.01)	−1.246***	(−35.43)	−1.107***	(−25.77)
futopt==4	−2.177**	(−52.19)	−1.923***	(−47.11)	−1.766***	(−35.46)
futopt==5	−3.226***	(−46.45)	−2.887***	(−42.74)	−2.621***	(−32.15)
Woman					0.0708**	(2.76)
Married or living together					0.303***	(6.23)
Separated or divorced					−0.313***	(−5.20)
Widowed					−0.188**	(−2.93)
Unemployed					−0.779***	(−12.28)
Home making					−0.00172	(−0.04)
Retired					−0.0378*	(−0.72)
One child					0.136**	(3.01)
Two children					0.148**	(3.27)
Three or more children					0.152**	(2.95)
Age					−0.0441***	(−8.92)
Age ² / 100					0.0482***	(9.88)
Household income PPP (log)					0.489***	(22.63)
Number of people in household					0.0404**	(3.11)
Constant	8.006***	(280.94)	8.597***	(141.19)	5.709***	(26.99)
Observations	35,065		35,065		22,632	
Adjusted R ²	0.152		0.257		0.333	

t Statistics are in parentheses.

Variable of interest:

I am optimistic about the future, graded on a scale from 1 to 5, where 1 is strongly agree and 5 is strongly disagree.

(1) The only regressor is the variable of interest

(2) Regressors include country dummies, but coefficients are omitted for brevity

(3) Regressors include control variables and country dummies, but coefficients of the latter are omitted for brevity.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Table F.24

European Quality of Life – Sept-2008, OLS estimates for happiness.

	(1)		(2)		(3)	
futopt==2	−0.544***	(−19.61)	−0.513***	(−18.66)	−0.472***	(−14.27)
futopt==3	−1.230***	(−39.33)	−1.113***	(−35.19)	−0.925***	(−23.84)
futopt==4	−1.741***	(−46.73)	−1.628***	(−43.53)	−1.388***	(−30.50)
futopt==5	−2.507***	(−38.77)	−2.347***	(−36.80)	−2.035***	(−26.41)
Woman					0.0705**	(2.98)
Married or living together					0.440***	(9.69)
Separated or divorced					−0.344***	(−5.97)
Widowed					−0.368***	(−6.07)
Unemployed					−0.526***	(−9.02)
Home making					−0.0292	(−0.70)
Retired					−0.0994*	(−2.03)
One child					0.157***	(3.70)
Two children					0.194***	(4.60)
Three or more children					0.204***	(4.21)
Age					−0.0487***	(−10.56)
Age ² / 100					0.0446***	(9.69)
Household income PPP (log)					0.362***	(18.27)
Number of people in household					0.0483***	(3.93)

Table F.24 (continued)

	(1)	(2)	(3)
Constant	8.260*** (340.36)	8.728*** (160.86)	6.868*** (35.59)
Observations	34,963	34,963	22,605
Adjusted R ²	0.116	0.185	0.266

t Statistics are in parentheses.

Variable of interest:

I am optimistic about the future, graded on a scale from 1 to 5, where 1 is strongly agree and 5 is strongly disagree.

(1) The only regressor is the variable of interest

(2) Regressors include country dummies, but coefficients are omitted for brevity

(3) Regressors include control variables and country dummies, but coefficients of the latter are omitted for brevity.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Table F.25

European Social Survey, IV estimates for life satisfaction: using distrust in the parliament as an instrument for the expectations about the future.

	Reduced form	OLS	2SLS
Trust in country's parliament	−0.0851*** (−28.93)	0.132*** (23.21)	
Gender	−0.0158 (−1.25)	−0.132*** (−5.60)	−0.154*** (−5.03)
Married	0.0788 (1.53)	−0.335** (−3.28)	−0.232 (−1.77)
Civil union	0.159 (1.45)	−0.345 (−1.82)	−0.0541 (−0.22)
Separated	−0.0250 (−0.29)	−0.495** (−2.81)	−0.524* (−2.44)
Divorced	−0.0552* (−2.43)	−0.346*** (−7.89)	−0.436*** (−7.79)
Widowed	−0.00644 (−0.24)	−0.403*** (−7.86)	−0.425*** (−6.53)
Employment contract	−0.0499** (−3.07)	0.188*** (6.18)	0.112** (2.83)
Age	0.0117*** (5.26)	−0.0579*** (−14.41)	−0.0400*** (−7.36)
Age squared / 100	−0.00464* (−2.09)	0.0638*** (15.78)	0.0572*** (10.71)
Number of people in household	0.0182** (3.08)	−0.0335** (−3.10)	−0.00555 (−0.39)
Household's total net income	−0.0616*** (−22.24)	0.146*** (28.58)	0.0483*** (5.40)
Hard to be hopeful about the future of the world		−0.326*** (−25.97)	−2.028*** (−22.00)
Constant		8.172*** (71.05)	14.38*** (43.75)
Cut1	−2.357*** (−36.33)		
Cut2	−1.063*** (−16.97)		
Cut3	−0.325*** (−5.21)		
Cut4	0.937*** (14.95)		
Observations	27,982	27,925	27,925
Adjusted R ²		0.306	.
F-statistic			538.50

t Statistics are in parentheses.

Regressors include country dummies, but coefficients are omitted for brevity.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Table F.26

European Social Survey, IV estimates for happiness: using distrust in the parliament as an instrument for the expectations about the future.

	Reduced form	OLS	2SLS
Trust in country's parliament	−0.0851*** (−28.93)	0.0727*** (4.65)	
Gender	−0.0158 (−1.25)	−0.313*** (−4.72)	−0.326*** (−4.84)
Married	0.0788 (1.53)	−0.169 (−0.53)	−0.110 (−0.34)

(continued on next page)

Table F.26 (continued)

	Reduced form	OLS	2SLS
Civil union	0.159 (1.45)	−0.126 (−0.74)	0.0340 (0.16)
Separated	−0.0250 (−0.29)	−0.600*** (−3.94)	−0.610*** (−3.70)
Divorced	−0.0552* (−2.43)	−0.256 (−1.78)	−0.304* (−2.09)
Widowed	−0.00644 (−0.24)	−0.725*** (−4.20)	−0.736*** (−4.25)
Employment contract	−0.0499** (−3.07)	0.200* (2.40)	0.158 (1.84)
Age	0.0117*** (5.26)	−0.0384*** (−3.32)	−0.0283* (−2.38)
Age squared / 100	−0.00464* (−2.09)	0.0469*** (3.86)	0.0431*** (3.50)
Number of people in household	0.0182** (3.08)	0.0199 (0.70)	0.0359 (1.24)
Household's total net income	−0.0616*** (−22.24)	0.0912*** (5.97)	0.0372 (1.90)
Hard to be hopeful about the future of the world		−0.272*** (−7.46)	−1.212*** (−6.13)
Constant		8.306*** (28.86)	11.73*** (16.93)
Cut1	−2.357*** (−36.33)		
Cut2	−1.063*** (−16.97)		
Cut3	−0.325*** (−5.21)		
Cut4	0.937*** (14.95)		
Observations	27,982	27,982	27,982
Adjusted R ²		0.019	.
F-statistic			21.58

t Statistics are in parentheses.

Regressors include country dummies, but coefficients are omitted for brevity.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

References

- Akerlof, G., Kranton, R., 2000. Economics and identity. *Q. J. Econ.* 115.
- Anthoff, D., Tol, R.S., Yohe, G.W., 2009. Discounting for climate change. *Open-Access, Open-Ass. E-J.* 3.
- Atkinson, G., Dietz, S., Helgeson, J., Hepburn, C., Saelen, H., 2009. Siblings, not triplets: social preferences for risk, inequality and time in discounting climate change. *Econ.: Open-Access, Open-Ass. E-J.* 3, 1–28. <http://dx.doi.org/10.5018/economics-ejournal.ja.2009-26>.
- Barsky, R., Juster, F., Kimball, M., Shapiro, M., 1997. Preference parameters and behavioral heterogeneity: an experimental approach in the health and retirement study. *Q. J. Econ.* 112, 537–579.
- Bartolini, S., Bilancini, E., Pugno, M., 2013. Did the decline in social connections depress Americans' happiness? *Soc. Indic. Res.* 110, 1033–1059.
- Becchetti, L., Giachin Ricca, E., Pelloni, A., 2009. The 60s turnaround as a test on the causal relationship between sociability and happiness. *Econometrica Working Papers Wp07, Econometrica*.
- Becchetti, L., Pelloni, A., Rossetti, F., 2008. Relational goods, sociability and happiness. *Kyklos* 61, 343–363.
- Beckerman, W., Hepburn, C., 2007. Ethics of the discount rate in the stern review on the economics of climate change. *World Econ.* 8.
- Bjørnskov, C., Dreher, A., Fischer, J., 2010. Formal institutions and subjective well-being: revisiting the cross-country evidence. *Eur. J. Polit. Econ.* 26, 419–430.
- Blanchflower, D., Oswald, A., 2004. Money, sex and happiness: an empirical study. *Scand. J. Econ.* 106, 393–415.
- Bowles, S., Gintis, H., 2011. *A Cooperative Species: Human Reciprocity and Its Evolution*. Princeton University Press, Princeton, NJ.
- Bruni, L., Stanca, L., 2008. Watching alone: relational goods, television and happiness. *J. Econ. Behav. Organ.* 65 (3–4), 506–528.
- Carlsson, F., Daruvala, D., Johansson-Stenman, O., 2005. Are people inequality averse, or just risk-averse? *Economica* 375–396.
- Cropper, M., Freeman, M., Groom, B., Pizer, W., 2014. Declining discount rates. *Am. Econ. Rev.* 104, 538–543.
- de Waal, F., 1997. *Good Natured: The Origins of Right and Wrong in Humans and Other Animals*. Harvard University Press, Cambridge, MA.
- Dietz, S., Asheim, G., 2012. Climate policy under sustainable discounted utilitarianism. *J. Environ. Econ. Manag.* 63, 321–335.
- Dolan, P., Peasgood, T., White, M., 2008. Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being. *J. Econ. Psychol.* 29, 94–122.
- Ferrer-i Carbonell, A., Frijters, P., 2004. How important is methodology for the estimates of the determinants of happiness? *Econ. J.* 114, 641–659.
- Freeman, A., 1979. *The Benefits of Environmental Improvement: Theory and Practice. Resources for the Future*, Johns Hopkins Press.
- Frey, B., Stutzer, A., 2000. Happiness, economy and institutions. *Econ. J.* 110, 918–938.
- Giglio, S., Maggiori, M., Stroebel, J., 2014. Very long-run discount rates. Technical Report. National Bureau of Economic Research.
- Gollier, C., Weitzman, M.L., 2010. How should the distant future be discounted when discount rates are uncertain? *Econ. Lett.* 107, 350–353.
- Gui, M., Sugden, R., 2005. *Economics and Social Interaction*. Cambridge University Press, Cambridge.
- Gujarati, D.N., 2011. *Econometrics by Example*. Palgrave Macmillan Hampshire, UK.
- Haidt, J., 2013. *The Righteous Mind*. Vintage Books, New York.
- Helliwell, J., 2001. Social capital, the economy and wellbeing. *The Review of Economic Performance: The Longest Decade: Canada in the 1990s*. Centre for the Study of Living Standards, Ottawa, Canada.
- Helliwell, J., Huang, H., 2008. How's your government? International evidence linking good government and well-being. *Br. J. Polit. Sci.* 38, 595–619.
- Helliwell, J.F., Huang, H., Grover, S., Wang, S., 2014. Empirical Linkages Between Good Government and National Well-being. National Bureau of Economic Research.
- Helliwell, J.F., Putnam, R.D., 2004. The social context of well-being. *Philos. Trans. : R. Soc. London Ser. Biol. Sci.* 359, 1435–1446.
- Kahneman, D., Knetsch, J., 1992. Valuing public goods: the purchase of moral satisfaction. *J. Environ. Econ. Manag.* 57–70.
- Kahneman, D., Krueger, A., 2006. Developments in the measurement of subjective well-being. *J. Econ. Perspect.* 20, 3–24.
- Keltner, D., 2008. *Born to Be Good*. W. W. Norton, New York.
- Knight, J., Song, L., Gunatilaka, R., 2009. Subjective well-being and its determinants in rural China. *China Econ. Rev.* 20, 635–649.
- Laibson, D., 1997. Golden eggs and hyperbolic discounting. *Q. J. Econ.* 112, 443–478.

- Layard, R., 2005. *Happiness: Lessons from a New Science*. Penguin, New York.
- Layton, D., Brown, G., 2000. Heterogeneous preferences regarding global climate change. *Rev. Econ. Stat.* 82, 616–624.
- Luttmer, E., 2005. Neighbors as negatives: relative earnings and well-being. *Q. J. Econ.* 120, 963–1002.
- Luttmer, E., Mariotti, T., 2003. Subjective discounting in an exchange economy. *J. Polit. Econ.* 111, 959–989.
- Nordhaus, W., 2006. The “Stern Review” on the economics of climate change. Technical Report. National Bureau of Economic Research.
- Nordhaus, W.D., 2007. A review of the Stern Review on the economics of climate change. *J. Econ. Lit.* 45.
- Ott, J., 2010. Good governance and happiness in nations: technical quality precedes democracy and quality beats size. *J. Happiness Stud.* 11, 353–368.
- Powdthavee, N., 2010a. *The Happiness Equation: The Surprising Economics of Our Most Valuable Asset*. Icon Books, London.
- Powdthavee, N., 2010b. How much does money really matter? Estimating the causal effects of income on happiness. *Empir. Econ.* 39, 77–92.
- Ridley, M., 1998. *The Origins of Virtue: Human Instincts and the Evolution of Cooperation*. Penguin, New York.
- Schimmack, U., Krause, P., Wagner, G., Schupp, J., 2010. Stability and change of well-being: an experimentally enhanced latent state-trait-error analysis. *Soc. Indic. Res.* 95, 19–31.
- Schneider, L., Schimmack, U., 2009. Self-informant agreement in well-being ratings: a meta-analysis. *Soc. Indic. Res.* 94, 363–376.
- Schwarz, N., Strack, F., 1999. Reports of subjective well-being: Judgmental processes and their methodological implications. In: Kahneman, D. (Ed.), *Well-Being: The Foundations of Hedonist Psychology*. Russell Sage Foundation, New York.
- Stern, N., 2007. *The Economics of Climate Change: The Stern Review*. Cambridge University Press.
- Sunstein, C., 2014. On not revisiting official discount rates: institutional inertia and the social cost of carbon. *Am. Econ. Rev.* 104, 547–551.
- Tomasello, M., 2009. *Why We Cooperate*. The MIT Press, Cambridge, MA.
- Uhlener, C., 1989. Relational goods and participation: incorporating sociability into a theory of rational action. *Public Choice* 62, 253–285.
- Van Praag, B., Frijters, P., Ferrer-i Carbonell, A., 2003. The anatomy of subjective well-being. *J. Econ. Behav. Organ.* 51, 29–49.
- van Reekum, C., Urry, H., Johnstone, T., Thurow, M., Frye, C., Jackson, C., Schaefer, H., Alexander, A., Davidson, R., 2007. Individual differences in amygdala and ventromedial prefrontal cortex activity are associated with evaluation speed and psychological well-being. *J. Cogn. Neurosci.* 19, 237–248.
- Wanous, J., Hudy, M., 2001. Single-item reliability: a replication and extension. *Organ. Res. Methods* 361–375.
- Weitzman, M., 1998. Why the far-distant future should be discounted at its lowest possible rate. *J. Environ. Econ. Manag.* 36, 201–208.
- Weitzman, M., 2001. Gamma discounting. *Am. Econ. Rev.* 260–271.
- Weitzman, M., 2007. A review of the Stern Review on the economics of climate change. *J. Econ. Lit.* 45, 703–724.
- Wooldridge, J., 2002. *Econometric Analysis of Cross Section and Panel Data*. The MIT Press.
- Wright, R., 1995. *The Moral Animal*. Vintage Books, New York.